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# Electronic Data Interchange

*In Procurement*

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## **Executive Summary**

### **ELECTRONIC DATA INTERCHANGE IN PROCUREMENT**

The information technologies that have improved commercial purchasing hold great potential for Government procurement as well. In commercial practice, electronic linkages between buyer and seller speed order placement, improve solicitation/offer/award processing, improve visibility of order status, support just-in-time inventory and distribution techniques, and generally achieve savings far in excess of start-up and operating costs. With judicious application, similar benefits are readily attainable for Government small purchases whose simplified procedures enable use of electronic means. Gaining these benefits for large purchases, however, will require development and implementation of a specific, permissive policy.

Electronic interface technologies have long played an expanding role in purchasing. The telegraph, telephone, telex, and facsimile are older communications technologies whose advantages have gradually been recognized in Government procurement regulations. More modern electronic interface technologies – electronic bulletin boards, electronic mail (E-mail), and electronic data interchange (EDI) – can provide even greater advantages and need similar acceptance. For example, unlike predecessors that merely supplemented paper contracting processes and provided little security, EDI offers secure, authenticated contracting transactions that can be electronically authorized, documented, transmitted, received, and acknowledged.

Automated Government procurement systems are currently producing hard-copy contractual documents that are mailed to contractors and entered into their automated contract management and order processing systems. This conversion of automated information to paper and back to automated form is not only slow and labor-intensive, it is error-prone. Modern automated procurement systems utilizing EDI will substitute electronic records and transactions for paper files and documents, doing much to streamline procurement operations and improve internal efficiency.

Government can emulate industry's experience with EDI but cannot duplicate precisely all of its applications. Commercial buyers can require their suppliers to have EDI capabilities; the Government cannot. Commercial buyers are under no obligation to publicize requirements, provide solicitations to all requesters, seek competition, consider protests, or promote use of small and minority business as suppliers. In contrast, in Federal procurement, requirements must be publicized widely; solicitations are publicly displayed and sent to all requesters to obtain full and open competition; bids are formally received and opened; and small, minority, and domestic businesses enjoy such advantages as receiving award although their prices are higher and even having many procurements set aside for their exclusive participation. Despite the complexities introduced by these requirements, we believe that Government procurement can comply with statutory requirements for full and open competition and small business opportunity while still providing offerors with faster, broader access to solicitations than is provided by current labor-intensive, mail-bound methods.

Federal Acquisition Regulation (FAR) Part 13, Small Purchase and Other Simplified Purchase Procedures, authorizes oral orders, oral quotations, written telecommunicated purchase orders without signatures, and minimal file documentation for purchases under \$25,000. Electronic orders, quotations, and records conform to FAR Part 13 requirements while offering better documentation and safeguards through electronic audit trails and software access controls. The Defense Logistics Agency's Paperless Ordering Placement System (POPS) and Standard Automated Materiel Management System (SAMMS) Procurement by Electronic Data Exchange (SPEDE) provide adequate proof of concept for small purchases and other simplified procedures using electronic means. But many other opportunities to streamline contracting by exchanging electronic requests for quotations, quotations, purchase orders, delivery orders, and provisioned item orders have yet to be realized. In particular, many opportunities remain for applying EDI to procurements above the small purchase limitation.

Obstacles also remain. A principal one is the concerns that have been expressed over legal requirements for signatures and written documents, standard forms, and enforceability or negotiability of electronic documents. We believe that these concerns may have been overstated and that, in any case, they can be accommodated

by using trading partner agreements and by regulatory changes to recognize and facilitate increased use of EDI in Government procurement.

To achieve the benefits of and overcome barriers to the further application of electronic interfaces to Government contracting, we recommend the following actions:

- Recognize that EDI is an integral part of an overall procurement process improvement strategy and that procurement EDI is part of a larger electronic relationship with industry including electronic payments.
- Establish pilot projects to test concepts and increase our knowledge of network management, security, competition, and small business issues that arise when using EDI for procurements under the FAR Part 14 sealed bidding procedures and the FAR Part 15 negotiation procedures.
- Develop an implementation strategy, based on the results of pilot EDI projects and procurement process improvement initiatives, that initially emphasizes small purchases and high-volume, repetitive ordering and gradually moves through a mixed paper/electronic transition period to achieve ultimate application to fully competitive large purchases.
- Amend the FAR to permit use of electronic contractual documents and procedures in appropriate circumstances when electronic signature, message authentication, audit trail, and record retention safeguards can be established to cover the risks posed by fraud, protests, and disputes.
- Develop security and authentication procedures for electronic transactions and records appropriate to the particular types of risk associated with various kinds of acquisition and with the specific procurement method used.
- Develop an EDI transaction implementation guide for common procurement documents to encourage uniform transactions and procedures within the defense industry and, ultimately, all Government.
- Include EDI concepts and procedures in Government procurement training courses to prepare buyers and managers for the cultural changes that will be required by and will result from paperless transactions and procurement process improvement.
- Establish programs through the Small Business Administration-sponsored small business development centers to inform small businesses of EDI's concepts and potential so that they can learn how to participate in electronic procurement networks.

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## CHAPTER 1

### EDI: THE NEXT STEP IN PROCUREMENT AUTOMATION

Most Government procurement activities are using automation in some form. Technology advances have permitted automated procurement systems to evolve from being used solely for assisting contract document preparation to functioning as complex, integrated total information systems. These more advanced procurement systems share information through networks with other Government computers, thereby improving decision making and processing. Use of new information technologies has improved internal processing, but these technologies have had little application as yet to external Government-contractor interfaces and processes. The next logical step in this evolution is to integrate internal Government purchasing systems with contractor systems through an electronic interface technology known as electronic data interchange or EDI. As procurement automation evolves and acquisition regulations adapt to this technology, EDI will provide DoD, and ultimately all of Government, with great opportunities.

#### WHAT EDI DOES

Electronic data interchange is the computer-to-computer exchange of routine business information. Commonplace in many private companies, it promises to become the preferred method for conducting business in the future. With the appropriate computer hardware, software, and communications, business and Government together can eliminate the tedious flow of paper purchase orders, invoices, shipping notices, and other documents and replace them with electronic equivalents. In its simplest form, EDI links the Government's automated purchasing computer and the contractor's order processing computer through telephone lines, as illustrated in Figure 1-1.

Computer-to-computer interchange of information is new neither to industry nor to DoD. Since the 1960s, large private companies and DoD activities have been communicating business information electronically but in nonstandard and proprietary formats. What is new is the emergence of nationally and internationally recognized data formats, commonly referred to as standards or transaction sets, that

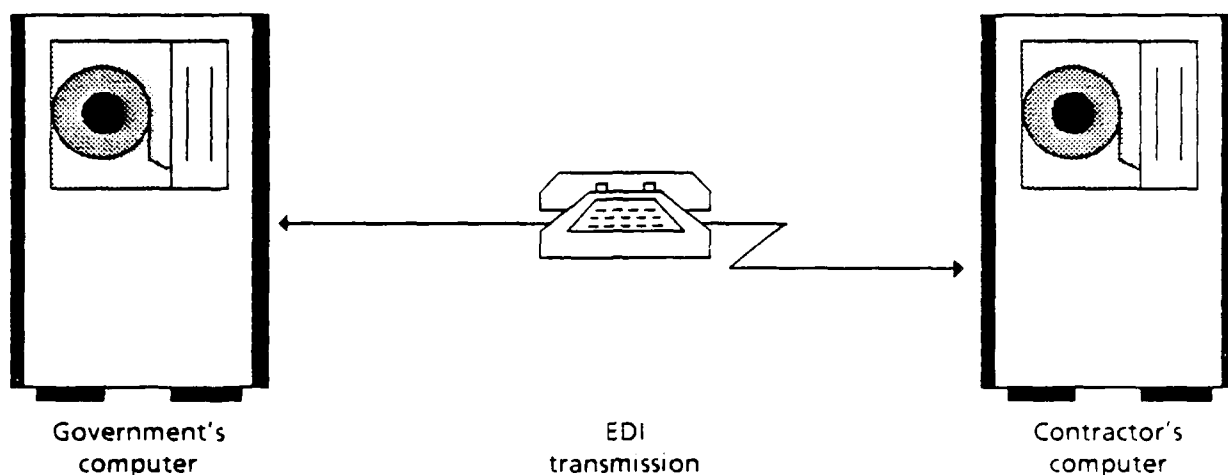


FIG. 1-1. COMPUTER-TO-COMPUTER EDI TRANSMISSION

serve to broaden and ease the interchange of data. The American National Standards Institute's (ANSI's) Accredited Standards Committee X12 (ASC X12) has developed national standards for electronically interchanging business transactions between industry members and among industries. The commercial standards eliminate the need to create special software to receive or send user-unique data formats. Instead one software designed to generate and interpret standard formats can be used to exchange information with all trading partners. And, interestingly, many companies are now using these same standards to facilitate the internal exchange of information.

The motivations for using EDI are compelling: the typical costs for processing a paper document, such as a small purchase order, can range from tens to hundreds of dollars, while conducting business electronically can slash costs by a third to a half. Specific benefits are greater record accuracy, lower data entry costs, decreased paperwork, faster answers to questions, reduced order time, and reduced inventory.

#### PROCUREMENT EFFICIENCY AND PROCESS STREAMLINING

Title 10, United States Code (U.S.C.) Section 2301 states:

The Congress finds that in order to ensure national defense preparedness, conserve fiscal resources, and enhance defense production capability, it is in the interest of the United States that property and services be acquired for the Department of Defense in the most timely, economic, and efficient manner. . . . Further, it is the policy of Congress that procurement policies and procedures . . . promote responsiveness of the

procurement system to agency needs by simplifying and streamlining procurement processes.

But despite any desire for efficiency, procurement is anything but efficient in actuality. Part of the reason is that the process, with its myriad rules and review steps, is physically moving information on paper documents in a sequential step-by-step procedure. Today's typical procurement system automates paper document preparation but not information processing. Paper is merely a medium for information; other media are available. Future automation using new technology, when coupled with streamlined processes, will improve information processing and result in greater procurement efficiency and effectiveness.

### **PROCUREMENT AUTOMATION IMPROVEMENTS**

The typical automated procurement system comprises computer-based software that helps prepare hard-copy contract solicitation and award documents and, as a byproduct in most applications, populates databases with management information. More advanced applications are now evolving that electronically receive and validate purchase requirements and coordinate the procurement action through near paperless electronic interfaces with (for example) legal, financial, small business, and technical specialists. Despite paperless internal processing, a hard-copy contract document is still printed, signed, copied, internally distributed, and mailed to the contractor. When received by the contractor, most of the information in this document is manually entered into the contractor's order processing or contract management system. This approach — converting automated information to paper and back to automated form — is slow, labor-intensive, and error-prone. When a paper document is handled and data are entered from it into an automated system, there will be misplaced documents and erroneous data entries. There is a better way.

### **COMMERCIAL PURCHASING SUCCESS**

Commercial purchasing has developed computer-to-computer links between buyer and seller to speed solicitation processing and order placement, to improve the handling of order and delivery status information, and to reduce data entry errors. This development proceeded from the fact that many firms began to realize that their purely internal automated systems were merely generating paper purchase orders that were mailed to suppliers who manually entered the same information into other automated systems. A better way enters purchase order information directly into the

supplier's system, avoiding printing, distribution, and data entry inefficiencies. Buyers' and suppliers' computers are programmed to communicate routine, noncomplex transactions automatically.

Use of new technologies, when coupled with a rethinking of how business is conducted, results not only in efficiencies but in improved acquisitions. The new processes, being flexible, are more responsive to changes in requirements, customers, markets, and the like. Rapid order placement and availability of real-time status information, made possible by electronic purchasing systems, are key elements of the just-in-time inventory and distribution concepts now being applied so successfully in modern business. Modern purchasing systems are critical tools in developing, producing, and supporting products. EDI is being adopted in the commercial world because of strategic competitive pressures. Although these pressures do not provide the impetus to adopt EDI in the Government sector, the same paybacks and gains in efficiency are equally available to that sector.

#### **DoD's EDI EXPERIENCE: COMMERCIAL ITEMS AND SMALL PURCHASES**

Some innovative DoD procurement activities have applied EDI to the problem of communicating with suppliers. Their initiatives have primarily involved ordering transactions for commercial items or for military items available through commercial distribution channels.

The best examples are two Defense Logistics Agency (DLA) projects – Paperless Ordering Placement System (POPS) and Standard Automated Materiel Management System (SAMMS) Procurement by Electronic Data Exchange (SPEDE) – that use EDI to pass orders valued at less than \$25,000 directly to the contractor. POPS competitively establishes indefinite-delivery contracts providing for electronic placement of orders. SPEDE establishes a blanket purchase agreement (BPA) that provides for simple electronic order placement in one version and provides for exchanging requests for quotations (RFQs), quotations, purchase orders, and acknowledgments in a more advanced version.

These projects have adequately demonstrated the feasibility and cost effectiveness of EDI small purchase and delivery order applications. This success should be replicated throughout DoD wherever electronic ordering arrangements can be established with cooperating contractors.

## **THE EDI CHALLENGE: LARGE COMPETITIVE PURCHASES**

Items currently acquired through electronic ordering are few in number, since the typical DoD supply item is not a commercial item available through commercial distribution channels. Most DoD procurement dollars are spent for items not carried in manufacturers' stock. Instead, they are spent for items that are designed to military specifications and that have significant production leadtimes. Aircraft, radar, and engine components are examples. Some military items have a history of significant, stable demand permitting long-term indefinite-delivery contracts calling for electronic order placement to be established. However, most items have less predictable demand and are acquired in small quantities whenever the stock reorder level is reached. For items valued at less than \$25,000 (the small purchase limitation), an electronic RFQ process is feasible and is already in use in certain buyer offices. Now the challenge for procurement automation is to develop electronic processes that can handle acquisitions above the small purchase limitation.

## **ASSURING INTEGRITY IN THE PROCUREMENT PROCESS**

Whatever electronic approach is taken, it is essential that the integrity of the procurement process be safeguarded. Nothing will cause rejection of electronic purchasing methods faster than the perception that competition-sensitive information cannot be safeguarded, or that electronically signed offers and awards cannot be relied upon in lieu of manual signatures on paper documents.

Technology has advanced to the point where such issues should no longer be controlling. Electronic signatures and message content can be authenticated with a greater degree of reliability than can those on paper. Network security procedures can protect both classified and sensitive unclassified information during transmission and database storage. Authentication and security techniques need be applied only when the risk of compromise justifies the implementation costs. A general rule would require authentication and security for purchases above the small purchase limitation: purchases involving greater likelihood of fraud, protest, or dispute, and more serious consequences should they occur.

## **PROCUREMENT PROCESS IMPROVEMENT**

Electronic data interchange complements two other management concepts being proposed for defense and Government procurement — increased use of

commercial practices and continuous process improvement. EDI is a technological tool used in commercial purchasing not only to automate purchasing but to change internal processes in general. In DoD, as procurement regulations accommodate technology, as computing systems are modernized, and as procurement automation improvements mature, procurement executives must search for better ways to do business, to streamline procurement by taking maximum advantage of automation, and to improve the effectiveness of the buying function.

## **ORGANIZATION OF THIS REPORT**

We present specific findings and recommendations in the next chapter. Chapter 3 discusses EDI concepts, describes benefits, and illustrates opportunities for changing DoD's supply and procurement processes. Chapter 4 analyzes and proposes specific solutions to legal, regulatory, and procedural impediments to the use of EDI in Government procurement. It concludes on an optimistic note by providing a structured implementation approach based on a risk assessment.

The appendices set forth a sample trading partner agreement and suggested changes to the Federal Acquisition Regulation (FAR) and DoD FAR Supplement (DFARS) to facilitate the increased use of EDI in Government and defense procurement.

## CHAPTER 2

### FINDINGS AND RECOMMENDATIONS

#### FINDINGS

##### **Inefficient Paper Processes**

Government purchases are written on paper (1) to delineate and document the parties' contractual responsibilities and (2) to convey to the supplier line-item descriptive, quantity, quality, price, and delivery information. In the contract formation process, the emphasis is on terms and conditions and on selecting a source. Once this lengthy process is completed, the essence of the business arrangement is simply what is ordered, when it is due, and where it is to be delivered.

A paper contract award or ordering process is essentially a paper production process requiring — depending on dollar value and/or type of action — numerous coordination, review, and approval steps before contract award. In a paper process, information flows only as fast as the paper flows. This handicap becomes obviously limiting in high-volume, repetitive ordering situations when all that is really needed is to convey the "what," "when," and "where" information, which can be stripped away from the already-agreed-to contractual framework.

Document preparation, review, approval, duplication, and distribution are time-consuming. Paper processing is slow and increases the risk of mistakes. Most procurement offices generate paper documents through some form of procurement automation, only to have the contractor extract the needed information from the document and re-enter it into its order processing or contract management system. This operation provides an opportunity for data entry errors (e.g., omission, transposition) and resultant mistakes in production, packaging, delivery, etc. In the few procurement offices that still prepare handwritten purchase or delivery orders, there are often problems in interpreting the buyer's handwriting. Again, an opportunity exists for data input errors and delays while checking for clarification. Another inefficiency associated with paper-based contracting is the poor quality of photocopies of solicitation, order, and award documents that are distributed to the contractor and contract administration and payment offices. Some photocopied

documents are so faded or blurred as to be unreadable. Finally, the incomplete or misdirected distribution of paper documents results in discrepancies between the files of contract administration offices, disbursing offices, and contractors. Many times it is not apparent that a crucial piece of paper is missing until the wrong item is delivered, or the right item is shipped to the wrong destination, or no item is delivered at all. The comparative efficiencies of EDI are obvious.

### **Commercial Purchasing Efficiency**

Some inefficiencies associated with contracting by means of paper documents have been resolved by use of commercial firms' EDI integrated with requirements and purchasing applications. When these firms have high-volume, repetitive orders, they establish long-term paper contracts to document contractual obligations and responsibilities, but they use electronic media to convey line-item details, streamlining and speeding up the process. In contrast to hand processing every order through a labor-intensive paper process, EDI purchasing automatically moves information from buyer to seller. Buyers may put considerable initial effort into selecting suppliers and establishing the written agreement, but subsequently they need expend only relatively minor effort in communicating what they want delivered, when, and where. Automated requirements bypass extensive procurement processing and go directly to the supplier's order processing system.

The benefits are manifold. There are no data input errors, misdirected distributions, or unreadable orders. Data are manually entered once, edited, and, if accepted, electronically passed to other internal computer applications and through a telecommunications network to the supplier. The process is streamlined and accurate. Network communication summaries list transactions sent and received. Acknowledgments verify order details received. Periodic follow-up messages indicate production or delivery status. Finally, shipment notices, invoices, and payments are all made automatically and electronically.

### **Procurement Process Improvement**

Some Government procurement activities have applied electronic interface concepts to procurement but have found that electronic transmission of documents alone has limited benefit. Technologies such as EDI must be integrated into automated procurement systems along with other procurement process improvements. Information technologies are enablers. They enable the procurement

process to change. Instead of merely automating the paper process, procurement automation can now facilitate changes in preaward information flows, review and coordination steps, and award processing and distribution. The very structure of the preaward process may now change with, for example, solicitations being made available through electronic bulletin boards. Solicitation mailing lists and their rotation may become obsolete. The labor-intensive procedure of telephoning for quotations or manual preparation of solicitation packages could be eliminated. The Electronically Assisted Solicitation Exchange (EASE) project at the Naval Supply Center, Jacksonville, is an example of how technology stimulates procurement process change. EASE has eliminated the practice of rotating RFQs among suppliers and obtaining just three quotations. When an RFQ is posted on the electronic bulletin board, it may generate many more than three quotations, thereby increasing small business opportunities, stimulating competition, and reducing prices. The burden of reviewing numerous quotations is minimized by automation, and overall the process is improved.

### **Unrealized Potential**

The potential for EDI use is huge in DoD, which made nearly 15 million prime contract awards in FY88. As can be seen from Figure 2-1, while the vast majority of dollars (91 percent) were spent on buys over \$25,000, nearly all the contract actions (98 percent) involved smaller procurements.

But there are DoD procurements other than small purchases that could benefit from use of EDI arrangements. When there is a long-term relationship between Government and contractor, and high-volume, repetitive transactions are expected, electronic order placement can speed the passing of line-item details, reduce data entry errors, facilitate interchange of status information, and eliminate paper documents. For example, the ordering of supply items under indefinite-delivery, multiple-award schedule, and spares provisioning contracts, regardless of dollar value, offers fertile ground for the use of EDI.

All of these arrangements rely on a previously negotiated contract to establish an ordering mechanism. Once this framework, with all the required clauses and certifications, is in place, orders are placed with a minimum of documentation and processing delays. An EDI ordering system would retain the written, paper contract but include a clause authorizing placement of electronic orders. When an EDI order

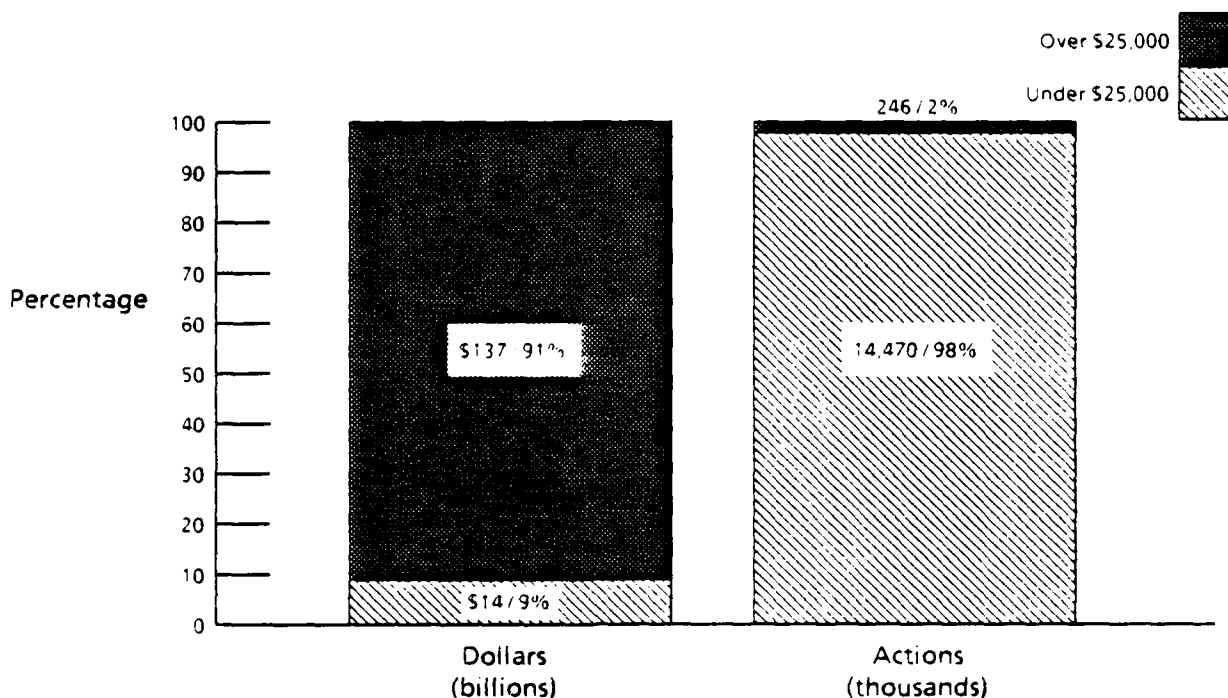


FIG. 2-1. DoD CONTRACTS - FY88

is generated, the Government supply or procurement computer would recognize the required item (from its stock number or part number) as being available under a prearranged ordering agreement, translate order details into an EDI transaction, and electronically transmit the transaction to the contractor's order processing system. Depending on review criteria established by procurement management, high-dollar-value orders or orders for special-interest items could be electronically submitted to a buyer or contracting officer for review and approval prior to release and transmission.

Information technologies also offer great potential for improving small business access to Government small purchase requirements. Such information is not readily available today except in publicly posted solicitation notices at local contracting offices.

Technology now permits solicitation notices, and even entire solicitations, to be displayed on electronic bulletin boards and EDI networks so any small business can access procurement opportunities anywhere in the United States via microcomputer

and telephone modem. Also, the small business can submit its quotation to the contracting activity via the same information technologies.

We believe that expanded use of information technologies will not inhibit small business participation. On the contrary, EDI and electronic bulletin boards will disseminate small purchase solicitation information so efficiently and fairly that small business participation will be stimulated. The Government's payoff will be increased competition, which will result in lower prices and better goods and services.

### **Automated Procurement Systems Require Few Changes**

Commercial EDI translation software will operate on most of DoD's automated procurement systems. Base and regional purchasing offices in the Air Force, Army, Marine Corps, and Navy are all operating minicomputer systems compatible with at least one commercial, off-the-shelf EDI translation software package (see Table 4-1). Most central supply purchasing mainframe and minicomputer systems are also capable of producing EDI transactions. The EDI translation packages permit data mapping to either internal databases or extracted flat files. However, the preferred approach would integrate EDI directly into the procurement system's internal processing.

### **Standard EDI Transactions**

Current EDI standards include common purchasing documents such as purchase orders and RFQs. Table 2-1 identifies the wide range of EDI transactions developed by ASC X12. ASC X12 is accredited by ANSI to develop American national standards, which are called ANSI X12 standards once approved. The flexibility inherent in EDI standards permits almost any purchasing document to be translated into an EDI transaction format, as has been demonstrated by the successful use of EDI by several Government EDI procurement and contract administration projects to communicate purchase orders, delivery orders, RFQs, quotations, invoices, remittance advice, and shipment notices.

If additional data need to be included in an existing transaction set, optional segments, data elements, and reference codes can be selected and implemented by agreement between the contracting parties. If new data elements or codes are needed, ASC X12 coordinates changes to the EDI transaction standard and data dictionary. For example, an initiative is underway among major defense contractors

**TABLE 2-1**  
**ANSI X12 TRANSACTION SETS**

Transaction identification number	Transaction title
810	Invoice
820	Payment order/remittance advice
823	Lockbox
830	Planning schedule with release capability
832	Price sales catalog
840	RFQ
843	Response to RFQ
846	Inventory advice
850	Purchase order
855	Purchase order acknowledgment
856	Ship notice/manifest
860	Purchase order change
861	Receiving advice
862	Shipping schedule
865	Purchase order change acknowledgment
867	Product transfer and resale
869	Order status inquiry
870	Order status report
997	Functional acknowledgment

and the ASC X12 Government Subcommittee to create transaction sets and segments for contract cost and schedule reports passed between DoD program offices, prime contractors, and subcontractors.

EDI standards permit tailoring of transactions to application data needs. This tailoring is accomplished through implementation guides for the documents (e.g., purchase orders, invoices, and shipping notices) transmitted. Implementation guides describe all the conventions and coding details for various specific types of written documents before the contracting parties exchange documents, permitting generic

documents to be adapted to specific industries or trading relationships without the need for unique transaction sets.

Nearly all Government procurement, financial, shipping, and program management documents can be adapted to the general EDI transaction, segment, and data element framework. Efforts are also underway by organizations such as the EDI subcommittee of the Aerospace Industries Association of America to translate the Material Inspection and Receiving Report (DD Form 250) and the Contract Pricing Proposal Cover Sheet (Standard Form 1411) into existing EDI transaction sets. It is important to note in this connection that, if the Government is to succeed in applying EDI concepts to its contracting processes, it must not create nonstandard transactions. To do so will only ensure that few firms will participate, since EDI participants will be reluctant to maintain two sets of software translators, each with a separate set of transactions — one commercial, one Government.

#### **Contractors Expect Faster Information and Payment**

Procurement automation's ability to pass order information rapidly to a contractor's automated system is impressive. However, contractors want their ultimate benefit to be faster payment. To achieve faster payment will require electronic submission of DD Form 250s as ANSI X12 856 ship notice transactions, and invoices as ANSI X12 810 invoice transactions, to DoD payment centers to improve the quality of information provided disbursing officers and speed its receipt. Electronic submission of DD Form 250 and invoice data should greatly facilitate payment decisions, and with electronic funds transfer (EFT) capabilities, ensure compliance with Prompt Payment Act requirements. The medical supply procurement implementation of DLA's SPEDE reported that introduction of EDI led to raised expectations among their small business contractors that particularly depend on timely payments. Electronic invoicing and payment projects in DLA are now starting to meet those expectations.

Also, a primary consideration of contractors participating in EDI projects is their opportunity to obtain not just prompt payment but early remittance advice electronically. If procurement orders, receiving documents, and invoices are transmitted electronically, contractors can obtain projected payment information by invoice number and line-item number weeks before actual payment. This information is extremely valuable to larger, sophisticated contractors that closely

manage cash transactions for opportunities to invest amounts in excess of daily cash needs. Cash managers can project cash flows weeks in advance while also working to resolve invoices rejected for payment.

### **Regulatory Exceptions to the Requirement for Written Documents and Signatures**

Procurement regulations are in constant change. They are influenced not only by revisions of statute but also by changes in procurement methods. As new technologies develop, procurement procedures and regulations accommodate them. The telephone facilitated use of oral quotes and orders. The telegraph allowed communication of last-minute bids and placement of orders through written telecommunications. Facsimile permits submission of bids and proposals by means other than the mails or hand delivery. The advent of computer-generated procurement forms has alleviated the need to maintain inventories of prescribed forms. As these technologies have evolved, the regulations have gradually adapted themselves to the new information transmission methods. The same acceptance is possible for electronic order placement under the small purchases and simplified procedures of FAR Part 13 and the ordering methods of Part 16.

Procurement regulations recognize exceptions to the requirements that procurements, or more precisely orders, be in writing and be signed. Specifically, FAR 13.506 exempts written telecommunicated purchase orders from any requirement for signature. Similarly, small purchase orders and delivery orders may be oral and obviously unsigned and unwritten, although delivery orders are to be later confirmed in writing. Finally, the small purchase and other simplified purchase procedures of FAR Part 13 minimize the need for file documentation.

These less rigid rules in FAR Part 13 make possible electronic paperless orders in lieu of oral or telecommunicated orders, especially when modern electronic ordering systems can provide a level of documentation and authentication not possible with older technologies. Given the permissive, relatively flexible nature of Part 13, it is probable that EDI can today be applied to small purchases without the need for regulatory deviation or change.

## **RECOMMENDATIONS**

### **Pilot Projects**

Innovative EDI concepts should be explored through small projects designed to develop the technology, increase our understanding of electronic contracting issues and problems, and reduce the perceived risk of using information technology in traditionally paper environments. Although DLA's POPS and SPEDE have successfully demonstrated EDI in central supply procurement, little is known of EDI's application to base/operational, construction, weapon system, or research and development contracting.

Pilot projects will require high-level support to overcome resistance to change. One-time deviations from FAR and DFARS requirements may be needed to test some concepts. Applying EDI to sealed bidding and competitive-proposal contracting without restricting competition or denying opportunities to small businesses is expected to pose many challenges.

### **Implementation Guides**

Standard DoD implementations of ANSI X12 transactions should be developed to facilitate acceptance of EDI in procurement and to ensure a uniform implementation with industry. This is necessary because many of the data elements critical to DoD's internal systems are optional in the standards. Published guidelines would provide industry with details in which optional data elements are mandatory when transacting business with DoD. Currently, the Services and agencies are independently developing their own interpretations of how these transactions should be implemented.

Although DoD represents almost 75 percent of Federal Government procurement spending, it should not act in isolation. Office of Federal Procurement Policy authorization of Government-wide implementation guides is recommended to ensure more uniform application of EDI standards and conventions.

### **Internal Distribution**

Any electronic ordering procedure must take into account how electronic documents can be passed not only externally to the contractor but also internally to other Government activities. For example, FAR Subpart 4.2 lists the distribution

requirements for contract award documents and their modifications. We may ask, what is the point of creating a streamlined electronic contracting system when paper documents must still be printed and mailed to administrative contracting offices, disbursement offices, and contract auditors lacking EDI capabilities?

What is needed are intra- and inter-agency EDI networks to distribute contract information to the same offices listed in the FAR. The first phase of DoD's Modernization of Defense Logistics Standard Systems (MODELS) applies ANSI X12 EDI concepts to the existing Military Standard Contract Administration Procedures (MILSCAP) transactions. MILSCAP transactions are data abstracts and therefore do not replicate the complete procurement document in the receiving computer system. Also, MILSCAP transactions are transmitted only to contract administration and disbursing activities and not to activities such as the Defense Contract Audit Agency (DCAA) offices cited in Subpart 4.2. Future phases of MODELS must include total contract distribution as contemplated by the FAR and DFARS.

#### **Total Electronic Information System**

Electronic data interchange is more than placing purchase orders through electronic means. It enables procurement activities to share documents and information with internal and external organizations through paperless processes. As illustrated in Figure 2-2, the Government and contractor should exchange electronic documents throughout the solicitation, award, and contract administration phases of the procurement's life cycle.

Electronic data interchange RFQs, quotations, purchase orders, purchase order acknowledgments, and purchase order changes contain all the information required to perform the procurement function. EDI invoices, shipping notices, and remittance advice support EFT, although the actual transfer of funds is not an EDI transaction. When paper invoices and DD Form 250s are converted to EDI transactions, information can be entered directly into disbursement systems, thereby minimizing one of the major contributors to payment delays. Now that payment requests and receiving reports are automated, sophisticated disbursing systems can provide — as a byproduct of their automated voucher examination process — an electronic list of accepted or rejected vouchers and the amount to be remitted by line item and in total.

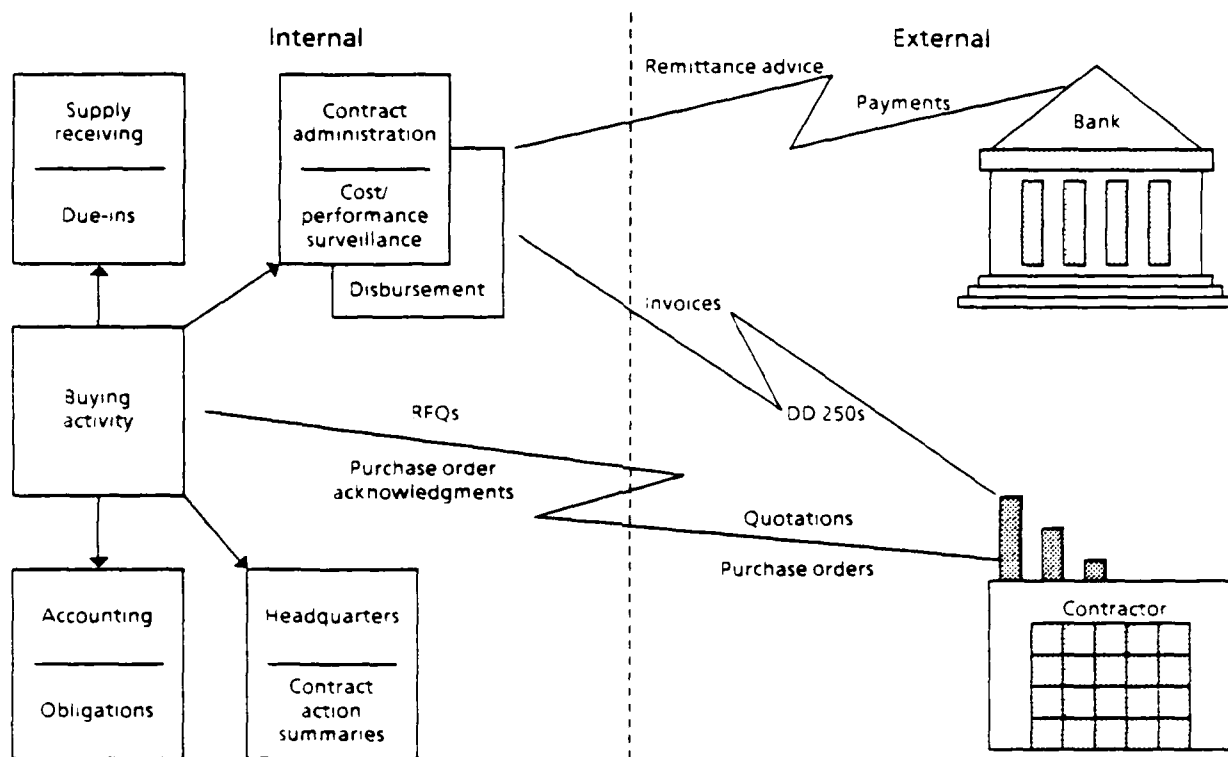


FIG. 2-2. TOTAL ELECTRONIC INFORMATION SYSTEM

Internally, EDI transactions permit automated procurement systems to pass award, obligation, and delivery schedule information to other local or command systems. For example, when issuing a purchase order, the procurement system no longer needs to print a hard-copy due-in report for the supply department's receiving dock. Since an EDI purchase order is automatically created by the procurement system, the award software – when transmitting the EDI transaction – can pass line-item-descriptive and delivery schedule details directly and simultaneously to the receiving system. The same is true of obligation information passed to accounting for recording purposes and of award information passed to command systems for management information purposes. By creating internal electronic transactions as a byproduct of EDI purchase order generation, electronic datafeeds can eliminate paper record storage, manual data entry, data errors, and follow-up phone calls to the buyer.

We recommend maximum use of electronic sharing of required information when the information already exists in digital form. EDI enables information sharing and overall process improvement.

### **Security**

To ensure the integrity of the Government's procurement function, adequate security must be provided for competition-sensitive and proprietary information when the risk of compromise warrants the expense. Such security is not warranted for low-dollar procurements, given the lower risk of fraud, which may not justify incurrence of security software and hardware costs. We recommend providing security for EDI transactions only in large competitive purchases where the risk of compromise may jeopardize the integrity of the competitive process.

### **Training**

Finally, we recommend that DoD include the EDI procurement concept in managerial and executive level training courses such as the DoD Procurement Executive Seminars. Once EDI prototype projects have matured and project managers have refined their implementation strategies, implementation experiences and recommended approaches should be included in DoD procurement training courses. If EDI procurement applications develop sufficiently, a dedicated EDI procurement course may be warranted in the early-to-mid-1990s.

## CHAPTER 3

### EDI APPLICATIONS: EXAMPLES AND NEW OPPORTUNITIES

Electronic data interchange is not a new concept. It originated during the 1960s in the transportation industry when paper documentation became so voluminous that shipments were misplaced and deliveries were delayed. At that same time, the industry discovered that shipment documents could be translated into digital data, transmitted to interested parties, and retranslated into usable information. Today, all the major transportation firms rely on EDI, integrated with their other automated systems, to convey information to shippers, freight forwarders, and others.

#### GOVERNMENT TRANSPORTATION PROCUREMENT APPLICATION

The Government's transportation function, like its commercial counterpart, has led the way in applying modern EDI concepts in the Federal Government. The General Services Administration (GSA), which oversees procurement of and payment for transportation services, amended the Federal Property Management Regulations (FPMR), effective 20 April 1989, to permit Federal agencies to electronically transmit carrier billings and backup documentation for freight and passenger transportation services as an alternative to issuing hard-copy standard forms. Of special interest to the Government procurement community is the authorization for EDI procurement of transportation services. The new section on EDI policy, added to the FPMR [Title 41 of the Code of Federal Regulations (CFR)] at 41 CFR 101-41.007, states

When mutually agreeable to the procuring agency and the participating carrier, authorization is granted to use EDI for the procurement of transportation services, provided that there are sufficient procedures to safeguard the integrity of the billing and payment process. An authenticating signature will be used in each transaction as the equivalent of a signature to certify receipt, delivery of goods, and that the bill accurately reflects the services provided and that the carrier charged the lowest charges available for the service. Each carrier must also provide a sec. 10721 quotation or present a unilateral ordering agreement to GSA or other agency of the Government that is establishing an EDI program, binding the carrier to all the requirements of Part 101-41 with the exception of the forms being used. EDI standards are prescribed in § 101-41.104.

The Government is now actively using EDI to procure and bill transportation services. This EDI procurement application is the first formally recognized by Federal regulation.

#### DoD EDI PROCUREMENT APPLICATION

In a simple EDI purchasing example, illustrated by Figure 3-1, the sending computer takes information that would normally be on the paper purchase order and translates it into an agreed-upon transaction format that can be read by the receiving computer. In return, the receiving computer can transmit either a purchase order acknowledgment or, if shipment is made, an invoice. The parties in this arrangement have previously executed a written trading partner agreement covering the generation and acceptance of electronic orders in lieu of paper orders. Paper has been eliminated as a means of conveying information.

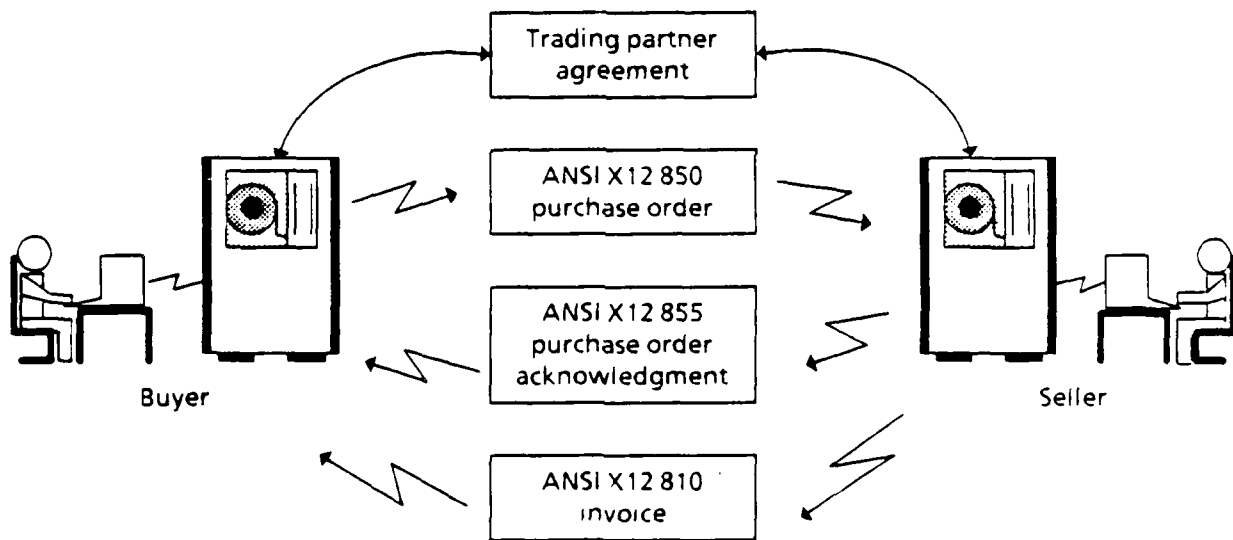


FIG. 3-1. SIMPLE EDI PURCHASING EXAMPLE

For some users, EDI is merely an electronic means of passing information extracted from paper documents. Paper purchase orders are manually prepared, entered into the sending computer, and passed to the receiving computer, only to be printed out as a paper document for action. Using EDI in such a manner provides little benefit besides eliminating mail time and reducing data entry errors.

Electronic data interchange links computers, not people in offices. EDI can be used to integrate automated, streamlined requisition, requirement, and procurement processes with automated, streamlined order processing and distribution processes.

Electronic data interchange will, if properly applied, permit the Government supply or procurement computer to communicate directly with the contractor's order processing system. The following steps describe such an EDI procurement application:

- Analyze the requisition using the Government's supply computer.
- Determine whether an electronic contracting arrangement has been previously established for the requested stock number or part number at an agreed-to price for the specified quantity.
- Translate the requirement information into a standard EDI purchase order transaction.
- Transmit the EDI order directly to the contractor's order processing computer.
- Notify internal systems of award, obligation, and delivery data.

But the process does not end there. The real power of EDI is not data communication but the way in which it facilitates other processes. Order information is automatically sent to the contractor's order processing computer, where software programs

- Analyze the order information
- Direct the regional warehouse to ship or deliver the item to the requiring unit
- Generate shipment notices and invoices and transmit them back to the Government.

This entire process from requisition through delivery can be accomplished within as little as 24 hours. Considerable cost savings are realized from reduced inventory, warehousing, packaging, and shipping costs.

#### **PAPERLESS ORDERING PLACEMENT SYSTEM**

An EDI system similar to the one described above is in operation today at the Defense General Supply Center (DGSC) as POPS. DGSC initially used POPS to

acquire supply items with storage/handling problems and/or limited shelf life (e.g., photographic film) but now has expanded POPS to include many other items that can be supplied directly from a contractor's distribution channels. DGSC has applied EDI concepts to indefinite-delivery contracts to obtain rapid delivery via the contractor's commercial distribution system. The benefits go beyond faster service to the requiring unit. They include inventory cost savings, since DGSC does not have to warehouse items if the contractor will stock the items in its commercial distribution system. Also, the Government no longer has to write off overage inventory repackage items or pay for second-destination transportation.

POPS contracts are normally competitively placed indefinite-delivery contracts with major suppliers. The criteria for selecting an item for POPS are

- Significant demand history
- Availability of commercial distribution channels
- Opportunities to reduce inventory, warehousing, and transportation costs
- Existence of suppliers willing to respond to electronic orders.

During the last fiscal year at DGSC, POPS processed over 60,000 orders with approximately 30 contractors. Most importantly, the DoD Inspector General's Report on Audit of Electronic Contract Ordering (Audit Report No. 87-188), of 10 July 1987, documented POPS compliance with the FAR. DGSC estimates that POPS has saved nearly \$30 million since going into operation in 1983. POPS has been exported to other DLA hardware centers. The concept can also be applied to military procurement activities using indefinite-delivery contracts to order supplies or services.

#### **SAMMS PROCUREMENT BY ELECTRONIC DATA EXCHANGE**

POPS is not DLA's only EDI success. There is also SPEDE, an EDI procurement subsystem of DLA's SAMMS.

SPEDE has applied modern EDI technology to several predecessor automated ordering methods. One was SASPS (SAMMS Automated Small Purchase System), which exchanged computer-generated shipping instruction sheets and computer punch cards with vendors. Another was PET (Procurement by Electronic Transmission), which relied on direct Government-to-contractor telecommunications in a proprietary format. Although both of these prior projects worked, neither had

the advantage of providing modern EDI's vendor acceptability, through use of national standards; document flexibility, through availability of variable-length transactions and formats; or ability to integrate electronic ordering at buyer workstations with order processing at vendor workstations.

SPEDE permits DLA supply centers to issue orders under a BPA and receive vendor responses electronically. Each vendor has entered into a standard BPA, installed Government-furnished SPEDE software on its IBM personal computer (PC)-compatible microcomputers, and agreed to certain telecommunications procedures. There are three versions of SPEDE. Two replace the SASPS functions. SASPS I issued calls under BPAs. SPEDE orders items simply by sending an ANSI X12 850 purchase order transaction to the supplier's microcomputer. If the price stated in the order is acceptable, the supplier replies with an ANSI X12 855 purchase order acknowledgment, eliminating any doubt as to whether the supplier will accept the order. SASPS II issued RFQs to suppliers that responded with a quotation, but there was not necessarily a BPA in place. For SASPS II, SPEDE issues an ANSI X12 840 RFQ transaction to as many as 12 suppliers, and they respond with ANSI X12 843 response to RFQ transaction. SPEDE evaluates the quotations and issues an ANSI X12 850 purchase order. Both SASPS versions of SPEDE also provide suppliers with electronic invoicing.

Another version is a hybrid between calls and RFQs under a BPA. At Defense Personnel Support Center's (DPSC's) medical supplies procurement activity, this version, SPEDE-Medical, provides a small purchase (less than \$25,000) RFQ/quotation/order system involving approximately 40 small business medical supply distributors. The SPEDE-Medical competitive small purchase module is the most advanced and promising EDI procurement application we have found. It has fully complied with ANSI X12 standards and has demonstrated procurement efficiency while stimulating competition, lowering prices, and providing small businesses with automated order/quotation tools. It is more than an order processing system.

Every business night, SAMMS downloads to SPEDE between 800 and 1,200 purchase requests. SPEDE determines which suppliers have transactions, calls up their microcomputers, and transmits that day's purchase orders, RFQs, and award information. The vendor checks the SPEDE software each morning and processes orders, RFQs, and quotations on the microcomputer. When a supplier

decides to provide a quotation, the DLA purchasing office eventually provides, back through SPEDE, either an order or a notice of which vendor received the award and at what price. Consequently, SPEDE's Government-furnished software provides small vendors with more than just order processing. It also provides, for management decisions, automated business records on the number of quotations, orders, and prices.

Defense Personnel Support Center's medical supply procurement activity has noted how, under SPEDE, competition is stimulated by the ease with which RFQs, quotations, and orders are handled and documented. Since, with EDI, buyers no longer rely on poorly documented telephone RFQs, vendors like the new system. Telephonic RFQs lend themselves to potential abuse by buyers who may have favorite suppliers or who may be in a hurry to make an award. SPEDE permits everyone to receive and document these small purchase transactions. In fact, SPEDE has been so well received by medical suppliers that DPSC has been approached by firms that had previously been reluctant to do business with the Government but changed their attitudes when they heard of SPEDE's ease of use.

SPEDE is currently being integrated with the DLA Pre-Award Contracting System (DPACS) to run on the Gould NP-1 minicomputer in each purchasing office. This integration of SPEDE and DPACS offers greater efficiency and less buyer interaction. The integrated system can now process many routine actions with little buyer involvement. Of course, if certain thresholds are exceeded or the offeror inserts remarks or conditions in its quotation, the buyer will be automatically informed.

SPEDE has been expanded to all DLA hardware centers. Its concepts and possibly its UNIX-based software can be transferred to other supply/purchasing activities in DoD. We highly recommend this EDI procurement system to the other Services and agencies.

#### **COMMERCIAL PURCHASING PRACTICES AND PROCUREMENT STREAMLINING IN DoD**

The President's Blue Ribbon Commission on Defense Management, popularly known as the Packard Commission, and the Secretary of Defense's Defense Management Review (DMR) emphasized greater reliance on commercial products

and increased use of commercial purchasing practices. POPS and SPEDE have been putting those initiatives into practice for several years.

The application of EDI to defense procurement will, to a certain extent, also bring together these same DMR initiatives. EDI is a commercial purchasing practice. The items best suited for EDI ordering are items already in commercial stock (off-the-shelf commercial items). And, lastly, EDI's greatest contribution is not just rapid interchange of business data but a rethinking of how items can be supplied more efficiently and economically.

This rethinking process that EDI fosters is what one defense procurement executive called "separating the simple parts from the complex parts of the procurement process." The objective is to establish a written contractual vehicle to enable electronic order placement. The complex part of the process is negotiating the written contractual document and establishing a supporting file. The document contains the agreed-to general and special provisions, while the file contains the representations and certifications required of the contractor. Establishing the contract may take from 6 to 9 months. The simple part of the process is conveying the order, with its line-item details of quantity, price, schedule, and shipment instructions. A great deal of effort and time are inevitably expended in establishing the contract, regardless of whether a paper-oriented system or EDI is used. But, with EDI, relatively little time is spent getting repetitive information to the contractor.

This approach of establishing an umbrella contract under which orders are issued is described in FAR Subpart 16.5, Indefinite-Delivery Contracts. When combined with EDI technology, the indefinite-delivery contract is a powerful tool for streamlining DoD procurement.

## **EDI PROCUREMENT OPPORTUNITIES**

Many business relationships between the Government and its contractors could benefit from the application of EDI concepts. Wherever repetitive transactions concerning line-item details are involved, an EDI link is possible. Several candidates for electronic ordering are

- Orders/calls under BPAs prescribed in FAR Subpart 13.2
- Delivery orders under indefinite-delivery contracts prescribed in FAR Subpart 16.5

- Orders under basic ordering agreements (BOAs) prescribed in FAR Subpart 16.7
- Orders under GSA multiple-award schedule contracts prescribed in FAR Subpart 8.4
- Spare parts and support equipment orders using the provisioning procedures for weapon system contracts prescribed in DFARS Subpart 217.74.

## **POTENTIAL EDI APPLICATIONS**

The availability of automated procurement systems throughout DoD provides an opportunity to establish EDI procurement networks with cooperating contractors expeditiously. The following applications illustrate how procurement can be improved when EDI is integrated with other automated systems.

### **Matching Requirements with Ordering Opportunities**

Contracting activities often prefer to order from indefinite-delivery or GSA Federal Supply Schedule contracts instead of entering the synopsis/solicitation/award cycle. The problem is identifying the appropriate ordering contracts. But, once they are identified, it may be possible to order and receive an item in days instead of months. If DoD were to provide supply or procurement systems with information helping to match required items with available indefinite-delivery contracts, EDI orders could be passed directly to the contractor, thereby eliminating lengthy delays.

There are two approaches – one using electronic bulletin boards to display the current line-item and ordering details of the indefinite-delivery contract and the other using ANSI X12 832 price sales catalog transactions to distribute details to supply and purchasing systems. GSA is currently using an electronic bulletin board for its automatic data processing (ADP) schedules. The next step should be the distribution of those details to automated systems so orders can be rapidly and accurately generated and transmitted.

### **Consolidating Orders**

As shown in Table 3-1, DoD placed nearly 700,000 orders under GSA multiple-award schedules in FY88. Those orders were for commercial items such as copiers [Federal Supply Group (FSG) 36], mobile radios (FSG 58), electronic test equipment (FSG 66), office supplies (FSG 75), office furniture (FSG 71), and computer equipment

(FSG 70) not stocked in the Government supply system but readily available from commercial sources.

**TABLE 3-1**  
**DoD DELIVERY ORDERS UNDER GSA MULTIPLE-AWARD SCHEDULES**  
**FY88**

Size of action	Number of actions	Value of actions (\$ billions)
Greater than or equal to \$25K	14,124	\$1.19
Under \$25K	666,973	\$1.31
Total	681,097	\$2.50

*Source: Federal Procurement Data System and Defense Logistics Support Office.*

Such a volume of business would justify making electronic ordering arrangements with at least major suppliers. If the top suppliers in each supply group participated, most orders could be handled electronically. In an analysis of FY88 Federal Procurement Data System (FPDS) data, it was noted that some major GSA multiple-award schedule contractors were also major providers under DoD indefinite-delivery contracts for the same supply classes. For example, in FSG 66, Hewlett-Packard and Texas Instruments are both major suppliers on both GSA multiple-award schedules and DoD indefinite-delivery contracts. If major DoD test equipment ordering activities could access their major suppliers electronically through EDI networks, there would inevitably be considerable order processing and distribution efficiencies and cost benefits.

#### **Weapon System Change Proposals, Change Orders, and Modifications**

Major weapon system program offices are burdened with numerous paper documents used to staff engineering change proposals, change orders, and eventual contract modifications. Weapon system contracts generate hundreds if not thousands of contractual documents during the weapon system's production phase.

Electronic data interchange could permit a more efficient exchange of documents required to propose, authorize, and definitize engineering and contract

changes. Not only could proposal and contract documents be exchanged, but inquiries and acknowledgments could improve configuration and contract management status when integrated with existing automated systems in the weapon system program office.

### **Weapon System Provisioning**

Provisioned item orders (PIOs) consist primarily of statements of line item, part number, quantity, required delivery dates, and ship-to points. Most PIOs are generated by Government automated systems and entered into contractors' automated systems. Therefore they lend themselves to handling by EDI techniques. The high volume of PIOs generated by weapon system programs, and the large number of modifications due to design change notices (DCNs), create considerable difficulties in maintaining information on contract status. EDI would do much to solve problems with the accuracy and completeness of contractor data records. Table 3-2 indicates the FY89 volume of PIOs (and of the line items involved) issued by Air Force Air Logistics Centers for two major weapon system programs. The Air Force F-16 fighter program, which has been in its production phase since 1973, still averages 70 PIOs per month. The B-1B bomber is now out of production, but the program still averages over 60 PIOs per month. Newer aircraft such as the B-2, C-17, and Advanced Tactical Fighter (ATF) will initially have more PIOs, while aircraft squadrons are being activated.

**TABLE 3-2**

**PROVISIONED ITEM ORDERS ISSUED IN FY89**

<b>Program</b>	<b>PIOs issued</b>	<b>Line items covered</b>
<b>B-1B</b>	750	3,667
<b>F-16</b>	840	2,308

**Source:** Air Force Systems Command's Acquisition Management Information System

## **Maintenance Job Order Contracting**

Electronic data interchange might be applied to task orders under service or construction contracts if price and task specifications have been previously established. A possible application would be job order contracts established for real property maintenance services. These contracts are firm-fixed-price indefinite-quantity contracts for specified maintenance tasks to be performed at competitively determined unit prices. Job orders are used widely for building-maintenance tasks on military installations. Given the establishment of an "umbrella" contract with predetermined prices and work packages, EDI could easily link the installation-level automated civil engineering system to an automated procurement system for processing EDI purchase order transactions against job order contracts. The automated procurement system could be located at either installation or regional levels.

## **Weapon System Replenishment Spares**

Many weapon system supply centers establish BOAs as a means of rapidly placing replenishment spare parts orders with sole-source manufacturers. Since demand for some items can be unpredictable and leadtimes lengthy, a prepositioned BOA is an excellent ordering vehicle to expedite the process when demand occurs. If sole-source items could be prescreened for breakout potential and then coded sole-source, requirements for them could be rapidly processed directly into the manufacturer's order processing and production scheduling systems. A few days or weeks of reduced procurement administrative leadtime (PALT) translates into reduced safety stock and increased readiness.

Currently, several DoD supply procurement centers are using electronic means in parallel with paper orders to buy spare parts from sole-source contractors. The Air Force's San Antonio Air Logistics Center and the Army's Aviation Systems Command both transmit MILSCAP transactions to the General Electric (GE) Aircraft Engine Group. These electronic ordering mechanisms could be modernized by replacing their proprietary formats with ANSI X12 transactions, relying on electronic transactions in lieu of paper, and formalizing the relationship with a trading partner agreement similar to the sample set forth in Appendix A.

A unique opportunity for electronic ordering of spare parts exists with commercial versions of aircraft and jet engines in military inventory. For example,

the Air Force has re-engined many of its KC-135 tanker aircraft with CFM-56 commercial engines (military designation F-108). The airline industry orders parts from the CFM-56 manufacturer, CFM International, through the Air Transport Association's electronic ordering system. CFM International maintains inventory on the basis of airline demand forecasts. The Air Force could use EDI transactions to order parts from the manufacturer in a similar manner, thereby reducing expensive inventory while gaining almost immediate parts availability.

## **CHAPTER 4**

### **RESOLVING LEGAL, REGULATORY, AND PROCEDURAL BARRIERS**

As new information technologies have been developed, Government procedures and regulations have been revised to accommodate new business practices – made possible by those technologies – that speed or improve the contracting process. Acquisition regulations gradually authorized telegraphic bids, telephone quotations, facsimile proposals, and computer-generated contract forms. EDI's acceptance will be no different, except that EDI will not just communicate information more rapidly, it will replace paper as a means of executing and documenting some contractual actions. EDI capability to supplant paper contracting has generated a number of legal, regulatory, and procedural issues. Most of these issues are being resolved by experience with the EDI contracting prototypes in operation at GSA and DLA. We are confident that these, and future prototypes, will demonstrate EDI's capability to provide better execution, documentation, security, and authentication safeguards than do paper systems.

#### **ELECTRONIC CONTRACT FORMATION AND LEGAL SUFFICIENCY**

The fundamental issue regarding EDI in relation to procurement is whether an electronic transaction forms an agreement that is legally sufficient to bind the parties.

In commercial practice, EDI participants agree to be bound by electronic transactions in accordance with a trading partner agreement. This affirms the enforceability of electronic communications and provides guidance as to the rights and responsibilities of the parties regarding interchange conventions, transaction standards, message timing, errors, omissions, and system failures.

A written trading partner agreement needs to be provided for in Federal procurement regulations to recognize EDI relationships and to bind the contracting parties when certain electronic transaction conventions are met. In the case of indefinite-delivery contracts that authorize delivery orders and weapon system contracts that authorize provisioning orders, a means of incorporating the agreement in the contract will be required. Appendix A is a sample EDI trading partner

agreement. Appendix B contains recommended FAR and DFARS changes to recognize EDI.

## WRITTEN CONTRACT REQUIREMENT

Courts and boards, in an attempt to do justice, will enforce a contract whether written or oral. Many times they will find a contract on the basis of the conduct of the parties or find that a contract is implied in law. Obviously, in these instances, there is no written contract. However, certain contracts in the private sector are required to be in writing. This insistence that some kinds of contracts must be in writing goes back to 1677, when the English Parliament passed legislation requiring that certain classes of contracts be in writing and be "signed by the party to be charged" before an action could be brought to enforce the contract. This legislation was part of a broad statute called "An Act for Prevention of Frauds and Perjuries," which was actually designed to prevent fraud and perjury in proving various transactions. Most jurisdictions have today enacted similar statutes, known as statutes of frauds, requiring certain contracts to be in writing. The most common is the Uniform Commercial Code (UCC), Section 2-201, which states that a

contract for the sale of goods for the price of \$500 or more is not enforceable by way of action or defense unless there is some writing sufficient to indicate that a contract for sale has been made between the parties . . . and signed by the party against whom enforcement is sought or by his authorized agent or broker.

The UCC defines "written" or "writing" as including printing, typewriting, or any other intentional reduction to tangible form [UCC §1-201(46)]. Further, it defines "signed" as including any symbol executed or adopted by a party with present intention to authenticate a writing [UCC §1-201(39)].

Just which contracts must comply with the Statute of Frauds varies among the jurisdictions (a contract to sell real estate commonly is required to so comply, but otherwise there is wide variation). If there is no statute in the jurisdiction requiring the contract to be in writing, it remains true today that an oral contract will be enforced.<sup>1</sup> In the current literature and journals, legal scholars invariably point to the Statute of Frauds as being of significant concern if not an outright impediment to EDI contracting. Many are calling for an amendment to the UCC to remove all

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<sup>1</sup>As a matter of fact, there are today so many exceptions to the Statute of Frauds that it is quite unusual to see it raised as a defense in contractual actions, although this occasionally happens

doubt. Such an amendment would be an ideal solution; it is also true, however, that laws change slowly, and oftentimes after a practice becomes customary in the marketplace.

With that background, it needs to be said that the UCC has not been enacted into Federal contract law. The basic legal framework in Federal contract law is composed of the U.S. statutes and regulations and the decisions of the U.S. courts and boards. Judges do, on occasion when facing a novel issue, turn to the UCC and adopt a principle now and then, but they are not bound to do so. They feel strongly about the ability to be free to develop further Federal contract common law.

A Federal statute enacted primarily in the matter of controlling financial obligations operates in the nature of a Statute of Frauds. As stated in 31 U.S.C. 1501(a)

An amount shall be recorded as an obligation of the United States Government only when supported by documentary evidence of —

- (1) a binding agreement between an agency and another person (including an agency) that is —
  - (A) in writing, in a way and form, and for a purpose authorized by law; and
  - (B) executed before the end of the period of availability for obligation of the appropriation or fund used for specific goods to be delivered, real property to be bought or leased, or work or service to be provided;
- (2) a loan agreement showing the amount and terms of repayment;
- (3) an order required by law to be placed with an agency;
- (4) an order issued under a law authorizing purchases without advertising —
  - (A) when necessary because of a public exigency,
  - (B) for perishable subsistence supplies, or
  - (C) within specific monetary limits;
- (5) a grant or subsidy payable —
  - (A) from appropriations made for payment of, or contributions to, amounts required to be paid in specific amounts fixed by law or under formulas prescribed by law;
  - (B) under an agreement authorized by law; or
  - (C) under plans approved consistent with and authorized by law;
- (6) a liability that may result from pending litigation.
- (7) employment or services of persons or expenses of travel under law;
- (8) services provided by public utilities; or
- (9) other legal liability of the Government against an available appropriation or fund.

This statute's requirement for "a binding agreement between agencies and other parties that is in writing" appears to impose a significant written documentation requirement severely restricting EDI's application to Government procurement. It is our interpretation that an "in writing" requirement is directed at providing sufficient documentary evidence to

- Establish a financial obligation by the Government for recording purposes
- Act as a Federal Statute of Frauds to prevent agencies circumventing spending restrictions by asserting oral contracts.

The issue turns on the question of what "in writing" means. Obviously, it means handwritten or typewritten and, given modern information technology, the term can be extended to devices that write and read information onto or from electronic media such as magnetic or optical disks. Properly designed electronic record systems can provide greater assurances of data accuracy than paper methods that are subject to forgery. Magnetic or optical disk media can receive, store, and retrieve information with sufficient reliability and security to provide acceptable documentation of a contractual agreement for purposes of financial recording and Statute of Frauds requirements. The terminology used with these electronic record devices is "read and write." For example, a capability found in some optical disk systems is called "write once, read many" or WORM.

Electronic transactions can be written to magnetic or optical (i.e., laser) media from which they can be read electronically and displayed visually. The question of "a writing," when viewed against 31 U.S.C. 1501, is ambiguous with respect to EDI. We believe that the desire of courts and boards to uphold the intent of the parties will prevail. Of course, what the intent of the parties is will be decided by the rules of evidence. Surely, if the intent of the parties is to form a binding agreement, and if the court finds the computer equipment and techniques to be reliable, the agreement will be enforced.

The written paper requirement is further limited when FAR 2.101 defines a contract as

a mutually binding legal relationship obligating the seller to furnish the supplies or services (including construction) and the buyer to pay for them. It includes all types of commitments that obligate the Government to an expenditure of appropriated funds and that, except as otherwise authorized, are in writing.

There are several authorized exceptions. FAR Part 13 authorizes oral orders for calls against BPAs at 13.201. At DFARS 208.405-2 (S-70), oral orders not in excess of the small purchase limitation are authorized for orders from multiple-award schedules. Oral orders issued against indefinite-delivery contracts must be confirmed in writing [FAR 16.506(b)], although this confirmation may not necessarily require a contractual document but simply a letter. Having made the point that in some circumstances the FAR permits unwritten contracts, we must still note that the FAR may need to recognize specifically that a properly designed electronic records system can meet the "in writing" requirement.

## **ELECTRONIC SIGNATURE AND AUTHENTICATION**

Government acquisition regulations require contracts to be signed. FAR 1.601 states "... Contracts may be entered into and signed on behalf of the Government only by contracting officers. ..."

FAR 4.101, Contracting officer's signature, states

(a) Only contracting officers shall sign contracts on behalf of the United States. The contracting officer's name and official title shall be typed, stamped, or printed on the contract. The contracting officer normally signs after it has been signed by the contractor. The contracting officer shall ensure that the signer(s) have authority to bind the contractor. ...

If necessary, EDI transactions can include an electronic message authentication code to ensure that the transaction is released by someone in authority. If EDI is to be applied widely, the FAR needs to be revised to recognize electronic signatures or authentication codes as an acceptable form of the contracting officer's and contractor's signatures, where the risk of fraud requires authentication. It should be noted that the small purchase procedures of FAR Part 13 authorize awards without signature at 13.506, where written telecommunicated purchase orders are recognized.

The requirement for electronic contracting transactions to be validated or authenticated by message authentication means should be limited to those transactions that are not exchanged under the auspices of a prior written EDI trading partner agreement. If the parties have already agreed to exchange standard electronic transactions through certain conventions, networks, passwords, etc., the use of message/signature authentication may be superfluous. And it may be

unnneeded as a deterrent to fraud if electronic audit trails, system access controls, and separation-of-duties techniques are used.

## **ELECTRONIC RECORDS**

Federal Acquisition Regulation 4.803(a) lists all items to be included in the contract file. One of these is the "original of the signed contract or award, all contract modifications, and documents supporting modifications executed by the contracting office." FAR 4.803(b) lists all items to be included in the contract administration office file. These include a "copy of the contract and all modifications, together with supporting documents executed by the contract administration office" and "orders issued under the contract." These FAR citations imply inclusion of only hard-copy contractual documents.

But note the statutory recordkeeping requirements specified at 44 U.S.C. 3101:

The head of each Federal agency shall make and preserve records containing adequate and proper documentation of the organization, functions, policies, decisions, procedures, and essential transactions of the agency and designed to furnish the information necessary to protect the legal and financial rights of the Government and of persons directly affected by the agency's activities.

Also note the statutory definition of a record at 44 U.S.C. 3301:

As used in this chapter (44 USC 3301 et seq.), "records" includes all books, papers, maps, photographs, machine readable materials, or other documentary materials, regardless of physical form or characteristics, made or received by an agency of the United States Government under Federal law or in connection with the transaction of public business . . . .

There is no statutory prohibition against using electronic or "machine readable materials" to document the "essential transactions of the agency" and "to furnish the information necessary to protect the legal and financial rights of the Government." To remove any doubt and to give comfort to the contracting parties, the FAR should be revised to recognize electronic documents explicitly. Additionally, the requirements of FAR Subpart 4.8, Contract Files, are optional for small purchase and other simplified procedures covered by Part 13. An EDI procurement system designed with proper controls over system access and record updates would have storage and retrieval advantages over a system using paper documents.

## **ELECTRONIC RECORDKEEPING**

The Federal Government established guidelines for electronic records in Federal Information Resources Management Regulation (FIRMR) Bulletin 23, dated 18 June 1985, which expired 1 October 1986. The National Archives and Records Administration (NARA) and GSA are attempting to establish an electronic recordkeeping regulation. The Federal Register of 5 December 1988 published their draft electronic recordkeeping regulation. Although it has yet to be finalized, some guidelines are available in NARA handbooks and instructional guides.

These guidelines delineate record creation, format standards, indexing, retention periods, storage media, and destruction considerations for electronic record system designers. They also point out that electronic record systems, if properly designed and maintained, present no greater legal problems than do paper records. Under the Federal Rules of Evidence [Rule 803 (8)], if the only official record established is electronic, it may be admitted as evidence as follows:

(8) **Public records and reports.**—Records, reports, statements, or data compilations, in any form, of public offices or agencies, setting forth (A) the activities of the office or agency, or (B) matters observed pursuant to duty imposed by law as to which matters there was a duty to report, excluding, however, in criminal cases matters observed by police officers and other law enforcement personnel, or (C) in civil actions and proceedings and against the Government in criminal cases, factual findings resulting from an investigation made pursuant to authority granted by law, unless the sources of information or other circumstances indicate lack of trustworthiness.

Automated system designers will therefore need to establish trustworthiness by ensuring that

- Record establishment dates and times are precisely defined
- All record modifications or alterations are automatically recorded by the system in an electronic audit trail
- The document was authorized to be issued ("signed") by an appropriate agency official.

## **PAPERLESS CONTRACTING**

Some procurement personnel are greatly concerned by the thought that the integration of buyer workstations, local area networks, optical disk systems, and EDI will create a paperless contracting environment. It is possible in some purchase

environments that most work will be done at automated buyer workstations. The Naval Supply Systems Command's (NAVSUP's) Procurement Early Development (PED) prototype small purchase system approaches being paperless. DPACS, when integrated with SPEDE, will also provide a near-paperless environment.

However, much of this concern is ill-founded. As can be seen from the following excerpt from the congressional Office of Technology Assessment 1988 study *Informing the Nation: Federal Information Dissemination in an Electronic Age*, paper still has some advantages over electronic display:

A note of caution with respect to the role of paper is in order. Despite the dramatic increase in computer technology and electronic information, paper documents are expected to have a continuing, major role for several reasons. First and foremost, for documents of significant length, research has found that reading from a computer screen is much more difficult than reading from paper, despite improvements in the design and resolution of screens and terminals. Even extensive practice at electronic reading does not appear to make a significant difference. Second, paper continues to be a more convenient and portable medium for many purposes, and accommodates a wide range of reading styles and locations. Third, for many documents, paper is still a bargain, although this is changing with the advent of optical disk technology. . . . Fourth, the paper format (especially for lengthy reports and books) permits the reader to browse through material and use a variety of conscious or subconscious search patterns that may be difficult if not impossible to replicate even with today's computer-based search and retrieval software. Reading paper formats can lead to greater comprehension.

Therefore, when reviewers must read and comprehend textual material (as when legal and procurement committees review files and buyers analyze proposals), it is unlikely that we will see a paperless contracting office. Although entire contracts may be stored on optical disk systems in the near future, there will still be a need for printed copies of the document and the file. There may simply be human engineering limitations on how far "paperless" contracting can go. This does not mean that when processing, reviewing, or approving repetitive transactions such as calls under BPAs or delivery orders under indefinite-delivery contracts, these operations could not be entirely automated without any paper documentation. However, the BPA or indefinite-delivery contract and supporting file themselves will most likely be in paper form.

## **SMALL BUSINESS CONTRACTING OPPORTUNITIES**

Public law and Federal acquisition policy clearly provide that small businesses shall be given every opportunity to participate in the procurement process.

As stated in 10 U.S.C. 2301: "Further, it is the policy of Congress that a fair proportion of the purchases and contracts entered into under this chapter be placed with small business concerns." FAR 19.201 states: "It is the policy of the Government to place a fair proportion of its acquisitions, including contracts and subcontracts for subsystems, assemblies, components, and related services for major systems, with small business concerns and small disadvantaged business concerns." FAR 19.202-3 states: "The contracting officer shall, to the extent practicable, encourage maximum participation by small business concerns, small disadvantaged business concerns, and women-owned small business concerns in acquisitions."

Obviously, any changes in how the Government conducts procurements must comply with small business procurement policy. Nothing can be allowed to be seen as denying small businesses the opportunity to compete, or as erecting barriers to small business participation.

The primary small business issue regarding EDI is the ability of small businesses to acquire the necessary expertise, hardware, and software to access the Government's telecommunications networks. It is feared that a significant number of small businesses will find this level of technology too burdensome and therefore that its use will restrict competition.

The question is not simply one of whether the small business will own a microcomputer; it is one of whether the small business will understand EDI concepts and technology. This is an educational and maturation process that may take some time; but, just as the public previously adapted to and accepted telephones, facsimile machines, automated teller machines, direct deposit of funds, and PCs, EDI will become a way of doing business. Electronic bulletin boards that are currently being accessed by more and more small businesses may be an intermediate step toward a level of sophistication that accepts ANSI X12 EDI transactions.

Therefore, the question is not when, but how small business contractors can be initiated into EDI contracting. Congress has stated that it is Government policy to aid, counsel, and assist small businesses in obtaining Government contracts

[15 U.S.C. 631(a)]. The Small Business Administration (SBA) and DoD small business programs may need to aid this process jointly. One possible educational program that could be used as a vehicle is the small business development centers funded by the SBA at local colleges and universities under Public Law 96-302.

Until EDI concepts are generally accepted, the Government will have to provide small business offerors access to solicitation information in paper form. This situation has been encountered before when Government procurement offices have introduced the use of new technologies. Comptroller General Decision B-224070, United Electric of Brevard, describes a situation in which a Government agency provided, as part of the bid package, photographically reduced copies of engineering drawings. A bidder had to possess the appropriate microform reader to view these reduced drawings. However, to provide all potential bidders access to information in the package, the agency also made paper copies of the engineering drawings available at the contracting office. The Comptroller General found that this arrangement did not restrict competition.

Similar arrangements need to be made when posting solicitation notices in electronic bulletin boards or placing electronic RFQs in telecommunications network mailboxes — a paper document will have to be provided for the least technologically capable small business. Eventually, probably in the mid-to-late-1990s, a small business without electronic means of receiving solicitations and awards will not be considered a viable business and this practice can be discontinued.

Also, we can look at commercial experience in implementing EDI purchasing systems with small businesses. Public utility companies, because of their highly regulated status, are required to meet State-mandated small and minority business goals as well as the Federal requirements of Public Law 95-507. Some of these utilities report increased business opportunities for small businesses as a result of utilizing EDI. For example, a hardware store or builder supply firm doing business with the local power generation plant is now able to receive solicitations from the utility's plants throughout the State. Access to the EDI network now broadens business opportunities beyond just the local public utility company. Some sophisticated small businesses that have made the move to EDI now market their EDI capabilities to prospective customers.

Information technologies such as EDI and electronic bulletin boards can provide small businesses wide-access information. Small businesses may find these technologies to be an equalizer, not a competition inhibitor.

## **RESTRICTIONS ON COMPETITION**

A requirement for an offeror to be able to receive solicitations or submit quotations or offers electronically would appear to be restrictive of competition. However, if the Government agency provides a paper alternative, or provides other means of obtaining electronic information, the Comptroller General has found in favor of technology. We predict that such a parallel system would disappear in a relatively short period of time.

In Comptroller General Decision B-234490, 26 May 1989, W. B. Jolley protested that an Army Corps of Engineers solicitation provision requiring that cost proposals be submitted on a computer disk restricted competition. The Comptroller General decided that such a requirement is not unduly restrictive of competition, because experience has shown that (1) submitting information on computer disks reduces time and errors in evaluating cost proposals involving numerous line items and (2) complying with the requirement involves relatively little expense or effort. Specifically, the Army furnished preformatted and programmed computer disks to the offerors and requested that they submit their offers for each of the approximately 500 line items on the provided disk. For those offerors lacking direct access to computers, the Army advised that most commercial typists or computer programming companies provide this service for a fee as low as \$25.

## **SYNOPSIS AND SOLICITATION NOTICE REQUIREMENTS**

Currently, several electronic bulletin board projects are underway within DoD that publicize contracting opportunities to potential contractors in narrow markets (e.g., telecommunications) or local trading areas (base installation support). The use of electronic bulletin boards or electronic bid boards to publicize procurement opportunities may be restricted for small purchases by current statutory language.

41 U.S.C. 416(a)(1)(B) states that

an executive agency intending to solicit bids or proposals for a contract for property or services shall post, for a period of not less than ten days, in a public place at the contracting office issuing the solicitation a notice of solicitation described in subsection (f) —

- (i) in the case of an executive agency other than the Department of Defense, if the contract is for a price expected to exceed \$10,000, but not to exceed \$25,000; and
- (ii) in the case of the Department of Defense, if the contract is for a price expected to exceed \$5,000, but not to exceed \$25,000.

The issue is whether the requirement "shall post, for a period of not less than ten days, in a public place at the contracting office" can be met by modern telecommunications media. Until electronic bulletin boards are generally accepted by the public, Government agencies will have to maintain both hard-copy solicitation notices and electronic bulletin boards. A statutory revision may be necessary to recognize electronic bulletin boards as a means of posting solicitation notices.

One impact of electronic solicitation bulletin boards will be a reduced need for manufacturers' representatives to visit contracting offices to search out procurement opportunities. Even the more sophisticated firms that acquire requirements information from supply centers and contracting activities via the Freedom of Information Act and sell the information to defense contractors of all sizes may be displaced by these electronic solicitation bulletin boards.

## REPRESENTATIONS AND CERTIFICATIONS

One issue concerning the use of EDI to solicit and receive offers has been the requirement for each offeror to complete and sign the representations and certifications included in Section K of the solicitation. The concern is that the submission and signature requirements would make any EDI offer nonresponsive. Also, the electronic submission of representations and certifications may seem impractical, given the legal uncertainties regarding electronic signatures.

A recent change to the procurement regulations to provide simplified contract formats has resulted in agencies' having the authority to use annual representations and certifications in lieu of individual-contract representations and certifications. Federal Acquisition Circular (FAC) 84-53, Item III, provides at FAR 14.213 and 15.407(i) for annual submission of representations and certifications. However, the offeror must still certify in individual offers that the annual representations and

certifications remain current, accurate, and complete as of the date of the offer, or must provide updated representations and certifications. Although this FAR change does not authorize EDI offers without representations and certifications, it is a move away from the concept that each contracting action requires its own complete, formal documentation. It is certainly possible that an EDI transaction could be devised to indicate the current status of the annual representations and certifications and the contractor's reaffirmation of them.

## **CONTRACTUAL FORMS AND CLAUSES**

Acquisition regulations prescribe contractual forms for certain contract actions. For placing orders, DoD generally uses DD Form 1155, Order for Supplies or Services. Additionally, certain clauses applicable to purchase orders are incorporated by reference in each order.

However, use of a prescribed form or any form is not always mandatory. In several places within FAR Part 13, for instance, provision is made for oral orders or written telecommunications orders. Therefore, if an EDI purchase order conveys the same information as an oral or telex order, while providing better controls and safeguards, why should it not be used?

ANSI X12 840 RFQ and 850 purchase order transactions currently provide clause reference transmission capability. EDI software is able to identify the appropriate regulation (e.g., FAR), the numerical reference (e.g., 52.203-5), and the clause title (e.g., Covenant Against Contingent Fees) and include this information within the N9 Reference Number data segment in the 840 or 850 transaction. As a practical matter, the standard clause requirements would be established in the trading partner agreement, and the need to identify clauses electronically would be limited to new or revised clauses. If a clause must be stated in full text, the MSG message data segment may be included in the 840 or 850 transaction.

Another approach is to use master solicitations to obtain a prospective contractor's written acceptance of clauses and provisions prior to the use of EDI transactions. To signify continued acceptance of clauses, the offeror could include a designated code in each bid.

## DEFENSE PRIORITIES AND ALLOCATIONS SYSTEM

Contracts supporting certain defense programs receive preferential treatment when designated as rated orders under the Defense Priorities and Allocations System (DPAS). The delivery requirements of rated orders take preference over those of all unrated orders. The authority to require priority performance of contracts and orders was granted to the President in the Defense Production Act of 1950, as amended (50 U.S.C. 2061 et seq.)

Rated orders are identified by a priority rating code of DO or DX and a program identifier (e.g., DO-A7 for airborne electronics equipment) to identify which authorized program is involved with the rated order. A rated order, as described in the DPAS regulations at 15 CFR 350.12, must contain the appropriate priority rating, a required delivery date, the signature of an individual authorized to sign rated orders, and a statement that reads

This is a rated order certified for national defense use, and you are required to follow all the provisions of the Defense Priorities and Allocations System regulation (15 CFR 350).

With EDI transactions, it is possible to include the priority rating, the delivery date, an electronic signature, and even the required text in the electronic transaction format. In fact, defense contractors today are issuing rated orders to their subcontractors using DPAS codes available in the ANSI X12 850 purchase order transaction set (Segment REF, Data Element 128 Reference Number Qualifier, Data Element 127 Reference Number) and by including a provision in the trading partner agreement recognizing the authenticity of electronic DPAS ratings. The elements of a rated order need to be revised at 15 CFR 350.12 to recognize EDI data elements, codes, and trading partner agreement provisions.

Another requirement of the DPAS regulations is that rated orders must be accepted or rejected. Notification must be provided as follows [15 CFR 350.13(d)]:

*Customer notification requirements.* (1) A person must accept or reject a rated order in writing within ten working days after receipt of a DO rated order and within five working days after receipt of a DX rated order. The person must give reasons in writing for the rejection.

(2) If a person has accepted a rated order and later discovers that, due to circumstances beyond the person's control, deliveries will be delayed, the person must notify the customer immediately, give the reasons for the

delay, and advise of a new shipment date. If notification is given verbally, written confirmation must be provided within five working days.

The standard ANSI X12 855 purchase order acknowledgment transaction will suffice for acceptance and for revision of delivery dates. However, if the rated order is rejected, a hard-copy written document will still be necessary, since it will eventually be forwarded to the Department of Commerce for official action.

## **STANDARDS AND IMPLEMENTATION GUIDES**

Given the genesis of EDI purchasing applications in commercial purchasing, there is some concern that current EDI transactions, segments, and data elements will not encompass the diverse contracting needs of defense procurement. EDI is not directed at incorporating all DoD procurement transactions at one time. Defense EDI will be first directed at high-volume, relatively simple purchasing actions such as purchase orders, delivery orders, and provisioned item orders. The ANSI X12 850 purchase order transaction is completely capable of transmitting these contractual actions.

Another issue is the development of EDI implementation guides for Government contracting actions. Implementation guides put in writing the rules for structuring a transaction for a given application and industry. They also document certain operating conventions. They are designed to eliminate message transmission and translation problems between the trading partners.

Within DoD purchasing, there will be varying ANSI X12 850 purchase order conventions depending on the type of contracting environment (e.g., commissary items, research and development task orders, provisioned spare parts, construction job orders, and delivery orders against multiple-award schedules). The implementation of each of these diverse actions may vary on the basis of the industry, the Military Service or agency, and the type of contracting. We recommend, however, that conventions for ANSI X12 transaction sets be developed to reduce differences among defense industry sectors.

## **CONTRACTOR COMPUTER DATA RETENTION REQUIREMENTS**

There has been considerable concern in the past over the provisions of FAR 4.703 regarding contractor retention of documents in computer media. Originally, FAR 4.703 required contractors to retain the original source or input

media for a document. In the case of EDI documents, this requirement might have been impossible to comply with, because there is no physical source document other than the keystrokes at a terminal.

However, this issue has been resolved by FAC 84-53, Item II, which revised FAR 4.703 to state that computer data need not be retained in their original form, provided the integrity of the source data is maintained and an audit trail is established by the contractor. FAR 4.703, Policy, now states in part that

... (d) If the information described in paragraph (a) of this section is maintained on a computer, contractors shall retain the computer data on a reliable medium for the time periods prescribed. Contractors may transfer computer data in machine readable form from one reliable computer medium to another. Contractors' computer data retention and transfer procedures shall maintain the integrity, reliability, and security of the original computer data. Contractors shall also retain an audit trail describing the data transfer. For the record retention time periods prescribed, contractors shall not destroy, discard, delete, or write over such computer data.

For the purposes of retaining EDI transactions and supporting documentation authorizing those transactions, FAR Subpart 4.7 should be revised to state clearly that electronic recordkeeping techniques are an acceptable means of contractor record retention as long as access, indexing, and storage safeguards are met.

## **DOCUMENT DISTRIBUTION**

Federal Acquisition Regulation Subpart 4.2 requires the contracting officer to distribute reproduced copies of the signed contractual documents to payment, contract administration, accounting and finance, and contract audit offices. If Government procurement offices successfully eliminate the need to send paper copies of contractual documents to contractors, they will still be bound by the FAR requirement to distribute copies within the Government. The appropriate solution would be to distribute the necessary contract information electronically and to eliminate physical distribution of hard-copy documents. DoD's MODELS project should transmit the electronic equivalent of the contractual document so it may be replicated in the receiving system. FAR Subpart 4.2 needs to be revised to permit electronic distribution of contract documents.

## INTERNAL ACCEPTANCE OF ELECTRONIC DOCUMENTS

System developers who create paperless contracting environments need to obtain acceptance from not only contractors but also from internal accounting, contract administration, disbursing, and audit staffs. These personnel determine — from contractual documents — requirements as to deliverables, prices, accounting citations, and, most importantly, obligation amounts. This information, traditionally derived from hard-copy documents, is entered into accounting, contract administration, and disbursement systems for recording obligations, tracking contract performance, and making payments. System users relying on electronic source documents must be assured that the information is accurate and trustworthy.

Information reliance is a current issue in the field of automated voucher-examining processes within disbursement systems. Disbursing officers are responsible for ensuring the accuracy of the facts stated on the vouchers and on the supporting records. The supporting records include documents that establish a contractual requirement, the contracted price, the value and citation of obligated funds, and the fact that the supply or service has been delivered or performed. Large-volume, highly automated voucher processing systems have been developed in response to the need to make payments promptly even though contracting, accounting, and contractor offices may be geographically dispersed. There are currently disbursement systems that use electronic processes to generate, transmit, and store information required to make payments.

As a means of furthering the acceptance of electronic processes, the General Accounting Office's (GAO's) Accounting and Financial Management Division recently revised its policies regarding the use of automation in support of the voucher examination and disbursement processes. GAO's *Policy and Procedures Manual for Guidance of Federal Agencies, Title 7 — Fiscal Guidance*, dated 12 February 1990, requires the following techniques to ensure the reliability of electronic information:

### 7.4 APPLICATION OF AVAILABLE TECHNOLOGY AND CONCEPTS

#### C. Data Authentication and Electronic Certification

With the proper application of available technology, it is possible to perform required prepayment audits without gathering together the source records. For example, different personnel can extract information from source records, input it to an automated system through computer terminals, and forward it through communications

networks to a centralized location for further processing, certification, and payment. However, using this approach requires agencies to implement techniques that will provide reasonable assurance that data in electronic messages are complete, correct, and authorized.

Implementation of electronic technologies requires that the voucher processing system be carefully structured and monitored to ensure that audit trails are maintained and that officials who are responsible for authorizing, certifying, and disbursing are in possession of the information needed to carry out their responsibilities effectively. Depending on agency need and preference, this structure can include a network of approving officials and/or assistant certifying officials, many variations of centralized/decentralized processing, and telecommunications systems with differing levels of control. Whatever the structure, individual responsibilities and the basis for the final certification and payment must be clear.

Various techniques can be used in the data authentication process to provide reasonable assurance that data in support of disbursements are authorized, accurate, and complete. For example, passwords, personal identification numbers, and special equipment can be used to control access to the data authentication system. The extent to which such controls are required over the individual steps in such a system may vary based on cost and risk considerations.

However, when the final certification of vouchers is accomplished electronically, the electronic signal or symbol adopted as the certifying officer's electronic signature must be initiated by methods that (1) distinguish the specific certifying official and (2) are under the sole control of the certifying official. Electronic certification of the final voucher also requires that control procedures be in place to ensure the authenticity of transmitted data, including the electronic signature. Such controls must provide reasonable assurance that deliberate or inadvertent manipulation, modification, or loss of data during transmission is detected.

The National Institute of Standards and Technology (NIST) of the Department of Commerce prescribes federal standards and guidelines for computer security and telecommunications systems in the Federal Information Processing Standards Publications (FIPS PUB). In particular, further guidance regarding data authentication requirements is in FIPS PUB 113. Also, FIPS PUB 140 provides standards for equipment used to perform cryptographic operations such as those outlined in FIPS PUB 113. Technology and standards in those areas are continuing to evolve. NIST plans to authorize certain private laboratories, under its National Voluntary Laboratory Accreditation Program, to certify that equipment offered by vendors meets applicable NIST security requirements.

Much of GAO's approach to authenticating a document's signature and content applies to procurement transactions passed to accounting for obligation recording or disbursement for identification of what is on contract. A key consideration for

automated procurement system developers is the internal control standard published by the GAO in *Standards for Internal Controls in the Federal Government* under the authority of the Federal Manager's Financial Integrity Act of 1982. It is our recommendation that the following internal control standards be met in any paperless contracting system:

- Transactions and other significant events must be documented.
- Transactions and other significant events must be recorded promptly.
- Transactions and other significant events must be authorized and executed by persons acting within their authority.
- Key duties must be separated among individuals.

A joint project to develop standard electronic authentication and signature processes based on the Department of the Treasury's Electronic Funds Certification project is planned. The participants are reported to be the Army's Corps of Engineers, the Administrative Office of the U.S. Senate, GAO, and the Department of Commerce's National Institute of Standards and Technology (NIST). The objective is to establish a generic signature and document authentication module that can be exported to any Government accounting, disbursing, travel, or procurement system that requires electronic certification of document content and authority. It is our assumption that, with GAO's participation, any authentication process developed will comply with the internal control standards.

#### **PROTECTION OF COMPETITION-SENSITIVE OR PROPRIETARY INFORMATION**

Classified telecommunications between the Government and its contractors are secured by National Security Agency (NSA)-approved encryption devices and keys. Obviously, any EDI transmissions of classified information will require encryption, and the contracting officer will need to use the clause at DFARS 252.204-7000, Telecommunications Security Equipment, Devices, Techniques, and Services. This clause also is used for securing transmission of other sensitive information; however, its requirement to use NSA encryption devices should be re-examined by the Defense Acquisition Regulatory (DAR) Council, given recent advances in telecommunications security technology.

Exchange of unclassified procurement data, however, was not a security issue until the Computer Security Act of 1987 (Public Law 100-235) mandated protection of unclassified but sensitive information. The act defined sensitive information as

... any information, the loss, misuse, or unauthorized access to or modification of which could adversely affect the national interest or the conduct of Federal programs, or the privacy to which individuals are entitled under section 552a of title 5, United States Code (the Privacy Act), but which has not been specifically authorized under criteria established by an Executive order or an Act of Congress to be kept secret in the interest of national defense or foreign policy; ...

It also defined "computer system" as

... any equipment or interconnected system or subsystems of equipment that is used in the automatic acquisition, storage, manipulation, management, movement control, display, switching, interchange, transmission, or reception, of data or information; ...

If competition-sensitive or proprietary information is found to be "sensitive information" under the act, EDI procurement systems will have to meet the act's computer security standards. Those standards are promulgated by the Secretary of Commerce on the basis of standards and guidelines developed by NIST.

It is clear that EDI and the storage and processing of the data meet the definition of a computer system. However, are the data being transmitted, processed, and stored via EDI sensitive? If procurement order data of an unclassified nature are transmitted without any security safeguards, will their disclosure adversely affect the

- National interest
- Conduct of Federal programs
- Privacy of individuals?

Although this determination must be made by computer security specialists within each of the Military Services and agencies, we believe that the answer is negative. A case could be argued that, in the aggregate, the disclosure of EDI line-item details for spare parts on specific weapon systems could affect the national interest. Intelligence analysts, with knowledge of critical parts, could, over time, estimate (1) the reliability of weapon systems and (2) unit readiness by analyzing requisition, ordering, and delivery transactions. Paper orders do not pose this problem, precisely because they are not automated and therefore cannot be easily

aggregated. Automation and insecure EDI do increase the potential for compromise. However, we believe that few electronic ordering systems would be so sensitive.

Beyond electronic order data, EDI handles competitive procurements in which quotations or offers are transmitted by means of insecure telecommunications. Although the disclosure of competition-sensitive information might taint the procurement process, we do not believe that compromise of small purchase quotations would "adversely affect . . . the conduct of Federal programs." The probability that small purchases would be subject to interception or tampering is low, because the cost of intercepting EDI transmissions does not reasonably correspond to the benefit to be derived from the information. At larger dollar values, however, the expected benefits might reasonably motivate someone to compromise the competitive process. In such a case, the Services and agencies should consider more sophisticated security procedures.

This is not to say that small purchases would not have any security safeguards. But their lower value and corresponding lower risks of tampering do not warrant the same security devices and software. Small purchases require the following:

- Transaction log
- Separation of duties
- Software access controls.

The mere fact that a small purchase system is being monitored through transaction logs and status reports is adequate to deter attempts to create false transactions or to alter data in transactions. Another method of providing safeguards is to divide duties so that no one person can control the entire procurement process from requirement through award. The most practical method is to have the buyer process the procurement action but have the contracting officer review and approve the award. In an automated system with EDI capabilities, only the contracting officer would have access to approval and signature software. This access would be controlled by the contracting officer's sign-on password or personal identification number (PIN). Buyers or clerks would have access to the procurement system, but their sign-on passwords would shunt them to their preparatory applications.

Large EDI purchases involving unclassified but sensitive information would require some form of encryption. The problem here is the cost of encryption links and

of maintaining encryption key distribution systems. The NSA-approved method is called DES, for Data Encryption Standard and is based on a dated single-cypher key technology. DES requires prior delivery of like secret keys by trusted couriers. It is clearly not cost-effective if national security interests are not at stake. A more economical and effective encryption method has been the goal of the Protection of Logistics Unclassified/Sensitive Systems (PLUS) program of the Office of the Assistant Secretary of Defense (Production and Logistics). The PLUS program recognizes DoD's need to protect all of its logistics networks, including MODELS, Computer-aided Acquisition and Logistics Support (CALS), and EDI initiatives, through

- Protection of external and internal communications
- Protection of digital data in storage
- Authentication of users and data
- Nonrepudiation of transactions.

The PLUS goal is to locate or develop data protection that (1) is a low-cost, commercially available product, (2) has a simple key management distribution process reaching a large user community, (3) is operationally transparent, and (4) does not degrade system performance. The PLUS final report's<sup>2</sup> recommended solution is a technology called Public-Key-Encryption (PKE):

Public-Key-Encryption (PKE) . . . is based on a double-cipher concept where a pair of keys is uniquely associated with each user. What one key of each pair encrypts can be decrypted only by the other key; and vice versa, but keys can not be derived from each other. This permits the disclosure of one key in a public key directory, similar in purpose to a telephone book, whereas the corresponding second key is held entirely in private by each user.

In particular, PKE concepts and algorithms have made it possible to transfer accepted business conduct into the invisible world of micro-electronics with unprecedented rigor. PKE can be applied not only for encryption but also for the absolute authentication of senders and recipients of electronic mail, for the exact authentication of message contents with so-called 'digital signatures' in place of hand-written signatures, and for the non-repudiation of electronic transactions.

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<sup>2</sup>Office of the Assistant Secretary of Defense (Production and Logistics). *Protection of Logistics Unclassified/Sensitive Systems (PLUS)* Final Report. Volume 1 30 October 1989

To illustrate the need for a higher level of security and authentication in an EDI procurement network, we need only recount GSA's experiences with an EDI bidding system for office furniture. Offerors were willing to exchange electronic solicitations, offers, and orders but were not willing to entrust their bid prices to electronic means. They simply could not trust the Government to protect their bids electronically. If the computer security standards envisioned by the Computer Security Act of 1987 and the PLUS program were in place, such trust would be assured.

## SYSTEM FAILURES

As the acceptance of EDI grows in Federal contracting, dependence on telecommunications networks will also grow. The American telecommunications industry is highly reliable, but there have been instances of local and national system failures caused by hardware and software failures.

The most notable hardware failure was occasioned by the destruction by fire of switching equipment of a local telephone exchange outside Chicago in the mid-1980s. All businesses on that exchange were completely isolated from the national telephone network, regardless of long distance carrier. It took several weeks for service to be restored. If a contractor or Government agency relies on EDI to transact business, such an occurrence could disastrously delay placement of orders and receipt of solicitations and offers. It is also possible that electronic transactions can be misplaced or dropped at a crucial moment in transmission.

The January 1990 failure of AT&T's nationwide long distance system was attributed to software problems. It was estimated that during the 8-hour disruption in service, 50 percent of all long distance calls were not completed. Again, if we are solely dependent on electronic means, we may jeopardize completion of business transactions at a crucial moment.

These failures are rare, but they pose a risk to the Government's ability to conduct business. This risk is manageable, just as paper system failures are manageable. Paper systems have also failed. Snowstorms, floods, and postal strikes have delayed and even disrupted mail service. A delay in receiving an award or modification document is tolerable when there are alternative communications means. The contracting officer can always resort to private mail services and telephone facsimile devices to get the document to the contractor. However, if a bid submission is delayed by disruption of the U.S. Postal Service, the delay can be costly

for a contractor unless the bid was mailed by registered or certified mail no later than 5 days prior to bid closing. This arrangement provides contractors an effective means of protecting themselves from delays and even failures of the paper mail system. When exchanging electronic documents, a carefully drafted trading partner agreement can allocate this risk in an equitable manner.

As electronic bidding systems develop over the next few years, they must provide a means of bid submission certification equivalent to that provided by the current paper methods. The use of a bid submission acknowledgment transaction might give the offeror sufficient confidence that the bid was successfully transmitted, received, and understood by the contracting activity's automated system. Instead of a postal clerk stamping the time and place of mailing on the certification, an electronic system would provide an acknowledgment of receipt by the intended recipient, not an intermediary. If contractors are confident that bids no longer have to be submitted at least 5 days prior to bid opening, they will obtain extra time to respond and extra time to prepare a winning bid.

#### **PROCUREMENT PERSONNEL CHANGES**

Electronic data interchange ordering reduces the amount of paper processed and thereby reduces the time and number of people needed. As more and more orders are automatically processed, the number of procurement clerks and lower level buyers will tend to decline; these personnel will be replaced to some extent by a relatively few higher level buyers, needed to establish long-term contracts and negotiate trading partner agreements.

Defense General Supply Center's experience with POPS indicates that, when EDI is applied, a shift in the type of work and the level of procurement personnel results. Also, DPSC's experience with SPEDE indicates that buyers' time is spent less on clerical work and more on analysis and on decisions referred by the automated procurement/EDI system.

Government procurement managers need to become aware that, as EDI increases productivity, there will be opportunities for staff reductions and perhaps for grade changes.

## AVAILABILITY OF EDI TRANSLATION SOFTWARE

One issue that will concern automated procurement systems managers is the availability of EDI translation software compatible with their operating systems and computer hardware. The Logistics Management Institute's (LMI's) *A Guide to EDI Translation Software*, August 1989, identifies over 50 commercially available EDI translation software packages. EDI translation software exists for all but one of the systems shown in Table 4-1. This is an issue only for systems with a software/hardware configuration not in wide commercial use. There are several DoD automated procurement systems that use either antiquated mainframe computers or modern minicomputers with proprietary operating systems. It will be difficult to locate EDI translation software for these systems.

TABLE 4-1  
EDI SOFTWARE FOR MAJOR AUTOMATED PROCUREMENT SYSTEMS

System/ subsystem	Service/ command	Hardware	Operating system	ANSI X12 EDI translator
ACPS	AF/AFLC	Data General MV 8000	AOS/VS	Available
APADE	Navy/NAVSUP	Tandem TPX	Guardian	Available
AMIS/DPCI	AF/AFSC	NAS 8063 Wang VS 65/85/100	MVS-XA VS OS	Available
APS	AF/AFLC	CDC Cyber 70	Scope	Unavailable
BCAS	AF/base-level	Wang VS 85/100	VS OS	Available
CCSS/PADDS	Army/AMC	IBM 4381 Perkins Elmer 3242	MVS OS 32 MT	Available
UICP/PED UICP/Purchase	Navy/NAVSUP	IBM 3090	MVS-XA	Available
SAMMS/DPACS	DLA	AMDAHL-V7 Gould 9050/NP-1	MVS UNIX	Available
SAACONS	Army	Sperry 5000/80	UNIX	Available

Sources: LMI's *A Guide to EDI Translation Software*, August 1989 and LMI Report PL804R1, *Greater Buyer Effectiveness Through Automation*, January 1989

Note: ACPS = Automated Contract Preparation System; AF = Air Force; AFLC = Air Force Logistics Command; AFSC = Air Force Systems Command; AMC = Army Materiel Command; AMIS = Acquisition Management Information System; APADE = Automation of Procurement and Accounting Data Entry; APS = Automated Purchase System; BCAS = Base Contracting Automated System; CCSS = Commodity Command Standard System; DLA = Defense Logistics Agency; DPCI = Distributed Processing for Contractual Input; NAVSUP = Naval Supply Systems Command; PADDS = Procurement Automated Data and Document System; PED = Procurement Early Development; SAACONS = Standard Army Automated Contracting System; SAMMS = Standard Automated Materiel Management System; UICP = Uniform Inventory Control Process

This limitation can be overcome through use of a micro or minicomputer as an interface between the mainframe and the telecommunications network. Such a front-end processor arrangement is depicted in Figure 4-1. The micro or minicomputer would contain the EDI translation software. Order data would be downloaded to the microcomputer, translated into EDI transactions, and passed to the telecommunications network for transmission. Although not as streamlined as having the translation software integrated with the source data, the front-end micro-/minicomputer arrangement avoids costly hardware replacement or customized software development, and sole-source procurement of translation software.

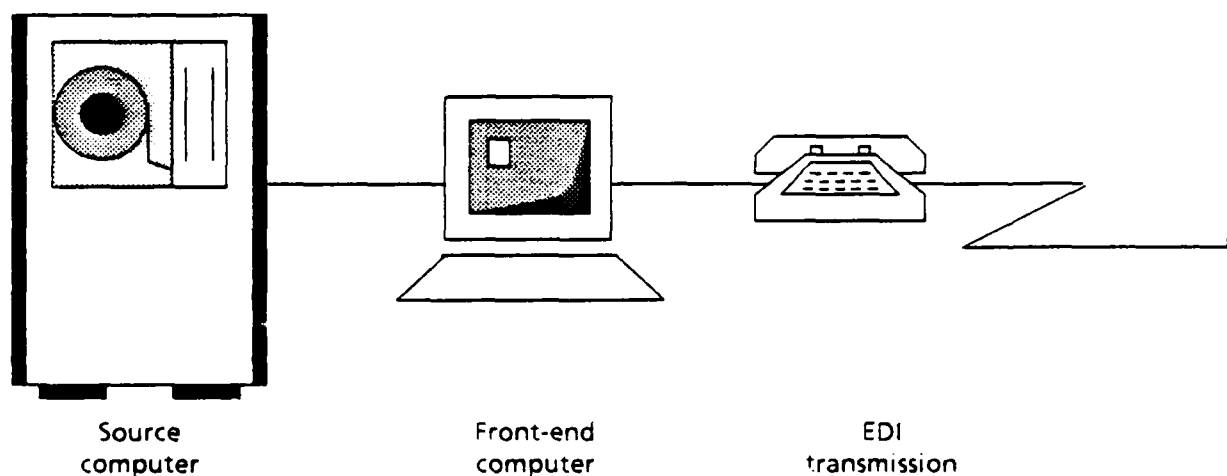


FIG. 4-1. FRONT-END ENVIRONMENT

Another solution is to develop an EDI translator independently. But this approach has been tried before and is fraught with problems. First, a Government design activity can rarely keep up with all the EDI transaction, segment, data element, and code table changes being generated by the ANSI X12 standards subcommittees. Software maintenance is best left to commercial software companies, which are motivated by market pressures and profits to offer the latest versions of ANSI X12 to their customers. If Government design centers attempt to develop their own translators, they may find their versions unable to take advantage of the latest EDI features and not in compliance with ANSI X12 standards and implementation guides.

## EDI IMPLEMENTATION

The simplified procurement procedures of FAR Part 13 by definition provide less rigid and less demanding means of purchasing supplies and services. The use of oral orders, telegraphic bids, and telecommunicated orders unsigned by contracting officers is evidence of a less formal, simplified documentation approach in Part 13. It is here that Federal procurement most closely approaches commercial practice. There is more reliance on the contracting officer's judgment as to extent of competition, price reasonableness, and the amount of documentation. There is a tradeoff between the cost of greater controls and the risk of fraud or loss.

Electronic data interchange, when applied with adequate safeguards, augments the simplified approach of Part 13. For actions within the small purchase dollar limitation, EDI security and documentation requirements should be minimal. For actions greater than \$25,000, greater security and documentation may be necessary. But transmission of line-item data in delivery orders and provisioned item orders under hard-copy paper contracts poses little risk and should require no more security and documentation than do small purchases. When there is greater risk of fraudulent transactions, contract disputes, or protests, there is a greater need for electronic signature and message authentication techniques. In some cases, PKE methods may be needed, because of risks of compromise of competition-sensitive or proprietary information. Some weapon system contracting situations may require encrypted telecommunications security. However, these cases are rare. Most procurements can be conducted electronically by implementing the following general procedures:

- Trading partner agreements
- Electronic audit trails
- Software access controls
- Separation of duties between preparers and approvers
- Data edits and controls.

Competitive procurements may need annual representations and certifications and master solicitations as a means to separate one-time contract documentation from the recurring transactions that can be automated. Tables 4-2 and 4-3

summarize our recommendations for implementing EDI in various types of contracting actions.

**TABLE 4-2**

**EDI PROCUREMENT APPROACH SUMMARY – LOW RISK**

Type of action	Risk assessment			Procedures recommended
	Disputes	Protests	Fraud	
Purchase orders <\$25K	Low	Low	Low	<ul style="list-style-type: none"> <li>• Trading partner agreement</li> <li>• Software access security</li> <li>• Electronic audit trail</li> <li>• Data edits/controls</li> <li>• Separation of duties</li> <li>• Functional acknowledgments</li> <li>• Purchase order acknowledgments</li> </ul>
RFQs/quotations <\$25K	Low	Low	Low	
Delivery orders All values	Low	None	Low	
PIOs All values	Low	None	Low	

**TABLE 4-3**

**EDI PROCUREMENT APPROACH SUMMARY – MEDIUM/HIGH RISK**

Type of action	Risk assessment			Procedures recommended
	Disputes	Protests	Fraud	
IFBs/bids >\$25K	Medium	High	Medium	<ul style="list-style-type: none"> <li>• Trading partner agreement</li> <li>• Software access security</li> <li>• Electronic audit trail</li> <li>• Data edits/controls</li> <li>• Separation of duties</li> <li>• Functional acknowledgments</li> <li>• Purchase order acknowledgments</li> <li>• Signature authentication</li> <li>• Content authentication</li> <li>• Protection of competition-sensitive information</li> <li>• Annual representations and certifications</li> <li>• Electronic recertification of representations and certifications</li> </ul>
RFPs/proposals All values	High	Medium	Medium	

*Note.* IFBs = invitation for bids; RFP = request for proposals

Application of EDI to procurement need not be all-inclusive. A gradual approach, starting with repetitive line-item ordering transactions under umbrella contracts having ordering agreements, is indicated. Also, it should be remembered that not all contracting relationships or contractors are suitable for EDI. Concentrating on large information flows and large contractors is most practical. Even if DoD were to limit application of EDI to its highest volume relationships only – maybe to the top 100 contractors – it would be able to conduct a vast proportion of its business electronically.

## GLOSSARY

ADP	=	automatic data processing
ANSI	=	American National Standards Institute
ASC	=	Accredited Standards Committee
BOA	=	basic ordering agreement
BPA	=	blanket purchase agreement
CALS	=	Computer-aided Acquisition and Logistics Support
CFR	=	Code of Federal Regulations
DD Form 250	=	Material Inspection and Receiving Report
DD Form 1155	=	Order for Supplies or Services
DES	=	Data Encryption Standard
DFARS	=	DoD FAR Supplement
DGSC	=	Defense General Supply Center
DLA	=	Defense Logistics Agency
DMR	=	Defense Management Review
DPACS	=	DLA Pre-Award Contracting System
DPAS	=	Defense Priorities and Allocations System
DPSC	=	Defense Personnel Support Center
EASE	=	Electronically Assisted Solicitation Exchange
EDI	=	electronic data interchange
EFT	=	electronic funds transfer
FAC	=	Federal Acquisition Circular
FAR	=	Federal Acquisition Regulation
FPMR	=	Federal Property Management Regulations

FSG	=	Federal Supply Group
GAO	=	General Accounting Office
GE	=	General Electric
GSA	=	General Services Administration
MILSCAP	=	Military Standard Contract Administration Procedures
MODELS	=	Modernization of Defense Logistics Standard Systems
NARA	=	The National Archives and Records Administration
NAVSUP	=	Naval Supply Systems Command
NIST	=	National Institute of Standards and Technology
NSA	=	National Security Agency
PC	=	personal computer
FED	=	Procurement Early Development
PIN	=	personal identification number
PIO	=	provisioned item order
PKE	=	Public-Key Encryption
PLUS	=	Protection of Logistics Unclassified/Sensitive Systems
POPS	=	Paperless Order Placement System
RFQ	=	request for quotations
SAMMS	=	Standard Automated Materiel Management System
SASPS	=	SAMMS Automated Small Purchase System
SBA	=	Small Business Administration
SPEDE	=	SAMMS Procurement by Electronic Data Exchange
UCC	=	Uniform Commercial Code
U.S.C.	=	United States Code

**APPENDIX A**  
**TRADING PARTNER AGREEMENT TO AUTHORIZE EDI**

The Department of Defense (DoD) uses a computer-based system to transmit and receive business documents, including procurement-related transactions processed from selected vendors.

\_\_\_\_\_ (Vendor), whose place of business is at \_\_\_\_\_, voluntarily chooses to participate in electronic data interchange (EDI) with the Department of Defense. Vendor agrees, by executing this agreement, to be bound by the terms and conditions of this agreement in addition to those of any contract separately entered into between Vendor and DoD.

It is mutually agreed by the parties that EDI is the exchange of data contained in normal business transactions, electronically, in a standard format.

The intent of this agreement is to create a legally binding obligation upon the parties using EDI and to ensure that (1) use of any electronic equivalent of documents referenced or exchanged under this agreement shall be deemed an acceptable practice in the ordinary course of business and (2) such electronic documents shall be admissible as evidence on the same basis as customary paper documents. The parties intend to be legally bound by them.

**I. OBJECTIVE**

DoD, its contract administration office, its payment office, and Vendor are using EDI technology as an alternative when selling, purchasing, and/or paying for supplies on account of the United States. This process will be used in lieu of paper hard-copy documents.

## II. SCOPE

Information exchanged through EDI will be the same as that currently required on paper documents. Required signatures will be electronically transmitted, using a discrete authenticating code described in each transaction set addendum. This agreement binds the parties to all the requirements of any underlying contract and requirements incorporated, with the exception of the forms being used.

## III. DURATION

This agreement must be signed by Vendor and accepted by the contracting officer before EDI operations begin. This agreement will commence on \_\_\_\_\_, 19\_\_ and continue until \_\_\_\_\_, 19\_\_ unless terminated pursuant to Section XII of this agreement.

## IV. STANDARDS

- a) DoD, Vendor, and payment offices shall strictly adhere to published American National Standards Institute (ANSI) X12 standards for approved transaction sets delineated in the addenda to this agreement and shall comply with DoD implementation guidelines.
- b) DoD, Vendor, and payment offices will support the current and previous versions of ANSI X12 within the following timeframe. DoD will give Vendor at least 90 days notice of intent of upgrade to a new published ANSI X12 standard. Vendor must upgrade to that new standard within 180 days after (1) DoD's published date of conversion or (2) the actual date of conversion, whichever is later. DoD will discontinue support of the previous version within 30 days after Vendor's conversion date, or 180 days after the published date of conversion, whichever is later.
- c) The parties shall have 30 days to engage in a parallel test until both are satisfied with the integrity of the electronically transmitted data.
- d) The receiving party shall give prompt notice to the originating party in the case of any contractual document transmitted in a garbled form. In the absence of such notice, the originating party's record content shall control.
- e) A functional acknowledgment, ANSI X12 transaction set 997, will be transmitted by agreement of the parties. If Vendor elects not to receive the

functional acknowledgment, Vendor will be responsible for using whatever means it wishes to ensure that the EDI message has been received.

f) Vendor will review and collect the contents of its electronic mailbox by 10:00 a.m. local time each business day. DoD will review and collect the contents of its electronic mailbox by 4:00 p.m. local time each business day. Vendor agrees to receive transmissions in parallel (paper and electronic) if desired by DoD for 1 month after a successful EDI link is established with DoD.

## **V. TRANSACTIONS AUTHORIZED**

The following transactions are authorized to be conducted as specified in Addenda A through D, which are made a part of this agreement. Further particular specifications and requirements – and further addenda – may be added to these addenda, which are as follows:

- Addendum A – Purchase order ANSI X12.1 transaction set 850
- Addendum B – Purchase order acknowledgment ANSI X12.9 transaction set 855
- Addendum C – Request for quotations (RFQ) ANSI X12.7 transaction set 840
- Addendum D – Invoice ANSI X12.2 transaction set 810.

## **VI. AGREEMENT REVIEW**

This agreement will be reviewed annually by the parties to make changes, additions, or deletions as may be desirable.

## **VII. DISPUTES**

All disputes, differences, disagreements, and/or claims between the parties arising under or relating to this agreement that are not resolved by negotiation shall be subject to the Disputes clause.

## **VIII. FORCE MAJEURE**

Neither party shall be liable to the other for failure to conduct EDI in the event of war; accident; riot; fire; explosion; flood; epidemic; power outage; act of God; act of public enemy; malfunction or inappropriate design of hardware or software; error of,

or nonperformance by, a third-party network; or any other cause beyond the party's control.

## **IX. DAMAGES**

Neither party shall be liable to the other for any incidental, exemplary, or consequential damages resulting from any delay, omission, or error in the electronic transmission or receipt of documents under this agreement.

## **X. START-UP AND CONTINUING EDI OPERATIONS**

DoD will not start the process of establishing an EDI relationship with a Vendor until that Vendor has demonstrated EDI proficiency. DoD will not provide EDI training or EDI implementation. Therefore, it is recommended that Vendor obtain professional EDI training. Vendor agrees to maintain trained EDI operators and EDI support personnel possessing the ability to perform independently EDI day-to-day operations. Contacting the DoD buyer's office with "how to" questions is inconsistent with this requirement. Training is Vendor's responsibility, and this requirement extends to having qualified operators to cover periods of vacations and other absences. Vendor shall maintain self-evaluation of its EDI performance and take corrective action to maintain performance at acceptable levels.

## **XI. SECURITY**

The parties agree to utilize adequate security practices (1) ensuring that transmission of documents is authorized and (2) protecting records and data from improper access. Vendor shall protect and maintain confidentiality of passwords used for EDI access. Vendor further agrees that its software shall provide adequate protection for password security. Vendor's personal-computer access shall be controlled by locking capability. The parties shall maintain the same standards of confidentiality, security, care, and diligence regarding EDI transactions as with paper contracting documents.

## **XII. TERMINATION**

This agreement may be terminated by either party by written notice designating the date of termination. It is expected that at least 30 days' notice of intent to cancel will be given prior to the cancellation date. Termination shall have no effect on transactions occurring prior to the effective date of termination.

Emergency termination of computer connections may be made by the parties to protect data from illegal access or other incidental damage. Such action does not constitute termination of this agreement. DoD reserves the right to remove Vendor from EDI interface if, in its judgment, Vendor's proficiency in EDI is below acceptable performance levels and Vendor does not correct the problems. Such removal is final and is not subject to the Disputes clause.

### **XIII. THIRD-PARTY NETWORK**

DoD and Vendor shall, before entering into this agreement, agree on the mode of document exchange. If the parties choose a third-party network to transmit, translate, or carry data between the parties, the third party is identified below.

The following third-party network is authorized under this agreement to process contract data for the purpose of EDI between DoD and Vendor.

\_\_\_\_\_ (Third party)

\_\_\_\_\_ (Address)

\_\_\_\_\_

Either party may change its decision to use a third-party provider upon 60 days' written notice. Neither party will incur any liability for costs associated with changing the third-party provider by action of the other party changing networks; however, the right to terminate this agreement still applies. Each party shall be responsible for the costs of its third-party network. The parties shall agree on the capability of the third-party network to provide such system/data security as data integrity, error-free protocol, identification code and password protection, encryption, etc., and shall make the requirements/specifications for such capability a binding part of this agreement by specifying them in Appendix \_\_\_\_.

### **XIV. SIGNATURE**

Vendor will use a code as specified in each transaction set addendum as its discrete authenticating code in lieu of signature and as the equivalent of a signature. Vendor agrees that its authenticating code carried in that transaction set shall suffice to assure that Vendor originated and possessed the requisite authority to

originate the transaction. Each party agrees not to disclose its own discrete authenticating code or that of the other party to any unauthorized person. Receipt of Vendor's authenticating code in the proper data element and set shall signify its intent to be bound by this agreement as well as the terms and conditions and all references in any underlying contract.

#### **XV. WHOLE AGREEMENT**

This agreement and all addenda attached constitute the entire agreement between the parties. No change in the terms and conditions of this agreement shall be effective unless approved in writing and signed by both parties. As the parties develop additional capabilities respecting EDI, additional addenda may be added to this agreement. Each addendum shall be signed by the parties and dated. The date of the last signature shall be the effective date, and each addendum shall be appended to this agreement.

#### **XVI. MISCELLANEOUS**

This agreement shall be governed and interpreted in accordance with the laws governing any underlying contract, i.e., U.S. Government statutes and Government contract law.

No waiver by a party of any breach or default hereunder shall constitute a waiver of any subsequent breach or default.

All notices under this agreement shall be in writing and shall be given by mailing them to the address identified below.

Vendor:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Attn: \_\_\_\_\_

DoD:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Attn: \_\_\_\_\_

IN WITNESS WHEREOF, the parties have executed this agreement.

Vendor:

DoD:

By \_\_\_\_\_

By \_\_\_\_\_

Name \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

Title \_\_\_\_\_

Date \_\_\_\_\_

Date \_\_\_\_\_

[*Note:* With advice of counsel, this trading partner agreement may be established as a stand-alone document.]

**APPENDIX B**  
**RECOMMENDED ACQUISITION REGULATORY CHANGES**  
**TO RECOGNIZE EDI**

**RECOMMENDED CHANGES TO FAR**

1. Revise FAR Part 2, Definitions of Words and Terms, to establish a definition for "electronic data interchange" by adding the following: "Electronic data interchange" means the transmission of business information from contracting documents in one computer to another computer. For example, EDI permits a purchase or delivery order and its line-item details to be passed electronically to the contractor's order processing system upon award.
2. Revise FAR Part 4, Administrative Matters, to recognize electronic techniques in the areas of contract signature, distribution, and files.
  - A. Revise Subpart 4.1, Contract Execution, to authorize electronic signatures, as follows:

**4.101 Contracting officer's signature.**

.....

(c) Contract documents generated by automated procurement systems may use an electronic signature to represent the contracting officer's authorization of the contract action. No electronic signature is required for small purchases or for orders under indefinite-delivery contracts, basic ordering agreements, Federal Supply Schedule contracts, or provisioning procedures in weapon system contracts when the parties have agreed, in a trading partner agreement, to accept electronic orders or quotations without electronic signatures. When electronic signatures are used, the following conditions shall be met:

- (1) Use of personal identification codes to control access to electronic signature generation software.

- (2) Transmission and storage of a discrete electronic symbol to represent the contracting officer's signature.
- (3) Use of a discrete authentication intended to bind, as a means of verifying the authority of the individual originating the contracting action and to validate transaction content. Federal Information Processing Standard (FIPS) Publication 113 on Computer Data Authentication should be consulted.

B. Revise Subpart 4.2, Contract Distribution, to authorize electronic storage of contract documents and files, by establishing the following new section:

**4.204 Electronic data interchange distribution.**

EDI contracting systems may be used to distribute contractual documents under this subpart if they –

- (a) Transmit all the information contained in the document to the receiving system; and
- (b) Provide an electronic signature in accordance with 4.101(c).

C. Revise Subpart 4.7, Contractor Records Retention, to recognize electronic recordkeeping techniques, by establishing the following new section:

**4.707 Electronic recordkeeping.**

**4.707-1 General.**

- (a) Contractors may use magnetic and optical disk media to store electronic records, subject to the limitations in this subpart.
- (b) The use of electronic data interchange techniques in contracting produces paperless transactions and files that require retention by electronic means.

**4.707-2 Audit trails.**

- (a) Contractors shall establish and maintain an electronic audit trail of the creation, modification, deletion, and alteration of any electronic record, so as to be able to reconstruct transactions and decisions.

- (b) The precise date and time of any record establishment, change, or deletion shall be recorded.

#### **4.707-3 Filing and retrieval.**

The contractor shall —

- (a) Establish and maintain an effective indexing system to permit timely and convenient access to electronic records by the Government;
  - (b) Provide strict access controls to prevent unauthorized access to electronic records and applications software; and
  - (c) Maintain duplicate magnetic or optical disk copies, stored at a site geographically removed from the primary electronic records.
- D. Revise Subpart 4.8, Contract Files, to permit electronic storage of contractual documents and files, by establishing the following new section:

#### **4.806 Electronic creation and storage of contract files.**

Contracting activities with automated contracting systems may create and store electronic contractual documents and files when —

- (a) Access to document creation software and applications is strictly controlled;
  - (b) Audit trails of every transaction and other significant events are maintained;
  - (c) Electronic documents and files are authorized and executed only by persons acting within their authority; and
  - (d) Dates and times of all record establishments and modifications are precisely defined and recorded.
3. Modify FAR Part 8, Required Sources of Supplies and Services, to recognize EDI as a valid means of placing orders under Federal Supply Schedule contracts, by

revising Subpart 8.4, Ordering From Federal Supply Schedules, as follows:

**8.405-2 Order placement.**

Ordering offices may use Optional Form 347, an agency-prescribed form, or electronic data interchange (EDI) transactions to order items from schedules and shall place orders directly with the contractor within the limitations specified in each schedule. EDI transactions shall be in accordance with 16.704.

- .....
4. Revise FAR Part 13, Small Purchases and Other Simplified Procedures, to recognize EDI as a valid means of placing individual purchase orders, orders under blanket purchase agreements, and delivery orders under indefinite-delivery contracts.

A. Amend Subpart 13.1, General, as follows:

**13.106(c) *Data to support small purchases over \$1,000.***

- .....
- (4) . . . Electronic data interchange (EDI) transactions and supporting data shall be recorded in an electronic file. (See Subpart 4.8, Contract Files.)

**13.107 Solicitation and evaluation of quotations.**

- .....
- (4) If Standard Form 18 is not used for written solicitations, contracting officers may request quotations using an agency-designed form, an agency-approved automated format, teletype, an electronic bulletin board, or an EDI request for quotations (RFQ) transaction.

- .....
- (7) When EDI is used for transmitting an RFQ, the provisions and clauses applicable to the solicitation shall be incorporated by

reference in the EDI RFQ transaction pursuant to the EDI trading partner agreement established in accordance with 16.704.

**13.108 Legal effect of quotations.**

.....

(b) When appropriate, the contracting officer may request the supplier to indicate acceptance of an order by notification to the Government, preferably in writing (including an EDI purchase order acknowledgment transaction).

.....

(c) If the Government issues an order resulting from a quotation, the Government may (by written notice – including an EDI purchase order change transaction – to the supplier, at any time before acceptance occurs) withdraw, amend, or cancel its offer. (See 13.504 for procedures on termination or cancellation of purchase orders.)

B. Add a new section 13.110, as follows:

**13.110 Agency use of electronic data interchange (EDI) techniques.**

Agencies are encouraged to apply EDI ordering, acceptance, receiving, and invoicing techniques to small purchases. EDI offers rapid order placement, minimal paper documentation, and an automated transaction audit trail while supporting electronic links between purchasing, accounting, supply, receiving, and payment activities. Any exchange of EDI transactions between a Government contracting activity and a contractor shall be established through an agreement in accordance with 16.704.

C. Revise Subpart 13.2, Blanket Purchase Agreements, as follows:

**13.203-1 General.**

(j) BPA's shall contain the following terms and conditions:

(8) *Electronic Data Interchange Agreement.* If the contracting parties desire to exchange orders, delivery documents, or invoices electronically, an EDI trading partner agreement (see 16.704) shall be incorporated in the BPA.

**13.204 Purchases under Blanket Purchase Agreements.**

(e) Documentation of purchases under BPA's shall be limited to essential information and forms (including electronic data interchange transaction formats), as follows:

(3) If a purchase document is issued, informal correspondence, an authorized purchase form, a form developed locally for the purpose, or an agreed-upon electronic data interchange (EDI) transaction may be used.

D. Revise Subpart 13.5, Purchase Orders, as follows:

**13.506 Purchase orders via written telecommunications.**

(a) A written telecommunicated purchase order is an order for supplies or services that is electronically transmitted to a supplier and is not signed by the contracting officer. Written telecommunicated purchase orders

include orders transmitted via electronic data interchange (EDI) techniques in accordance with 16.704.

5. Revise FAR Part 16, Types of Contracts, to recognize electronic ordering under indefinite-delivery contracts and to establish electronic data interchange agreements:

- A. Revise Subpart 16.5, Indefinite-Delivery Contracts, as follows:

**16.501 General.**

- (d) Agencies and their contractors are encouraged to apply electronic data interchange (EDI) techniques when ordering, shipping, accepting, receiving, or invoicing under indefinite-delivery contracts. EDI offers rapid order placement, minimum paper documentation, and an automated transaction audit trail while supporting electronic links between purchasing, accounting, supply, receiving, and payment activities. Any exchange of EDI transactions between a Government contracting activity and a contractor shall be in accordance with 16.704.

**16.506 Ordering.**

- (c) Orders may be placed by written telecommunications or electronic data interchange (EDI) transactions, if provided for in the contract Schedule. Any use of EDI shall be in accordance with 16.704.

- B. Establish in Subpart 16.7, Agreements, a new section as follows:

**16.704 Electronic data interchange agreements.**

- (a) *Description.* An EDI trading partner agreement is a written instrument of understanding negotiated between a contracting

activity or contracting office and a contractor. Such an agreement, which is not a contract, shall specify –

- (1) Acceptability of electronic documents in lieu of paper documents;
  - (2) Acceptability of electronic signatures in lieu of manually written signatures;
  - (3) The EDI implementation guide that applies to the transactions communicated;
  - (4) Each party's telecommunications networks mailbox addresses and routings;
  - (5) Telecommunications timing and cost responsibilities;
  - (6) Responsibilities as to transaction and system errors;
  - (7) Responsibilities and contingencies as to system failures;
  - (8) The types of transactions (e.g., quotations, orders, invoices) that may be transmitted; and
  - (9) Each party's electronic recordkeeping responsibilities.
- (b) *Application.* An EDI trading partner agreement is used to define the conditions and responsibilities of contracting parties exchanging electronic transactions in lieu of paper documents. EDI concepts are most beneficial when large volumes of repetitive transactions (e.g., supply or service line items, invoices, or shipping notices) must be passed between Government and contractor automated systems.
- (c) *Limitations.* An EDI trading partner agreement shall not –
- (1) Cite appropriations or obligate funds;
  - (2) State or imply any agreement by the Government to place future contracts or orders with the contractor except when minimum order requirements are stated in indefinite delivery contracts; or

(3) Be used in any manner to restrict competition.

(d) *Contractual instruments incorporating EDI trading partner agreements.* (1) The EDI trading partner agreement shall be incorporated in the following types of contractual instruments when electronic placement of orders is authorized:

(i) Indefinite-delivery contracts.

(ii) Federal Supply Schedule contracts.

(iii) Blanket purchase agreements.

(iv) Basic ordering agreements.

(2) An EDI trading partner agreement may be established as a separate agreement that permits electronic exchanges of EDI transactions.

(e) *Contract clause.* The contracting officer shall insert the clause at 52.216-\_\_\_\_, EDI Trading Partner Agreement, in solicitations and contracts when use of electronic data interchange is contemplated.

6. Modify FAR Part 44, Subcontracting Policies and Procedures, to recognize electronic records and electronic data interchange as acceptable procedures in subcontracting, by revising Subpart 44.2, Consent to Subcontracts, as follows:

A. Add to section 44.202-2, Considerations, the following:

(a)(14) If the subcontract is in the form of an electronic record or is transmitted through electronic data interchange (EDI) means, the contracting officer shall determine whether the use of electronic signatures, records, and transmissions complies with Part 4.

B. Add the following new paragraph to section 44.203, Consent limitations:

(d) Contracting officers should not refuse consent to a subcontract merely because it is transmitted through electronic data interchange (EDI) means and stored in the form of an electronic record.

7. Revise FAR Part 52, Solicitation Provisions and Contract Clauses, to recognize EDI orders and to establish an EDI trading partner agreement.

- A. Replace the clause at FAR 52.216-18, Ordering, with the following revised clause:

**52.216-18 Ordering.**

As prescribed in 16.505(a), insert the following clause in solicitations and contracts when a definite-quantity contract, a requirements contract, or an indefinite-quantity contract is contemplated:

**ORDERING (MMM 199X)**

- (a) Any supplies or services to be furnished under this contract shall be ordered by issuance of delivery orders by the individuals or activities designated in the Schedule. Such orders may be issued from \_\_\_\_\_ through \_\_\_\_\_ [*insert dates*].
- (b) All delivery orders are subject to the terms and conditions of this contract. In the event of conflict between a delivery order and this contract, the contract shall control.
- (c) If mailed, a delivery order is considered "issued" when the Government deposits the order in the mail. Orders may be issued orally, by written telecommunications, or by electronic data interchange only if authorized in the Schedule. If an EDI trading partner agreement is incorporated in this contract, EDI transactions shall be in accordance with that agreement.

(End of clause)

- B. Establish a new clause at FAR 52.216-\_\_\_\_ as follows:

**52.216-\_\_\_\_ EDI Trading Partner Agreement.**

As prescribed in 16.704(e), insert the following clause in solicitations and contracts when use of electronic data interchange is contemplated:

**EDI TRADING PARTNER AGREEMENT (MMM 199X)**

If the Contractor executes the EDI trading partner agreement furnished in connection with this contract, the Contractor agrees to be bound by that agreement's terms and conditions governing any transactions with the Government through electronic data interchange (EDI), in addition to the terms and conditions of this contract.

(End of clause)

**RECOMMENDED CHANGES TO DFARS**

1. Establish the following new DFARS section 216.704:

**216.704 Electronic Data Interchange Agreements.**

DoD use of EDI in Government-to-contractor business communications shall comply with [Deputy Secretary of Defense memo of 24 May 1988 or DoD Directive XXXX.XX dated \_\_\_\_\_ when approved]. See 217.7404 regarding use of the clause at FAR 52.216-\_\_\_\_, EDI Trading Partner Agreement, in weapon system contracts that authorize provisioned items orders.

2. Revise DFARS Subpart 217.74 as follows to accommodate use of EDI in weapon system contracts that authorize provisioned items orders.

- A. Modify 217.7402(b) as follows:

- (b) Issuance of Provisioned Items Orders. Provisioned Items Orders shall be issued on either Standard Form 30, Amendment of Solicitation/Modification of Contract, or by means of an electronic data interchange (EDI) transaction (see 217.7404) and numbered in accordance with 204.7004-3.

- B. Establish the following new section 217.7404:

**217.7404 Electronic Data Interchange**

Provisioning and contracting activities are encouraged to use electronic data interchange (EDI) transactions to issue provisioned items orders and definitizing supplemental agreements. EDI offers rapid order placement, minimal paper documentation, and an automated transaction audit trail while supporting electronic links with supply, provisioning, accounting, receiving, and payment activities. Any EDI transaction between a Government contracting activity and a contractor shall be in accordance with the EDI trading partner agreement provisions of FAR 16.704. The contracting officer shall insert the clause at FAR 52.216-\_\_\_\_, EDI Trading Partner Agreement, in solicitations and contracts when use of EDI transactions is contemplated under a weapon system contract that authorizes provisioned items orders.

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